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SEVEN DOLLARS

CIO

HE MAGAZINE FOR INFORMATION EXECUTIVES

COVER STORY

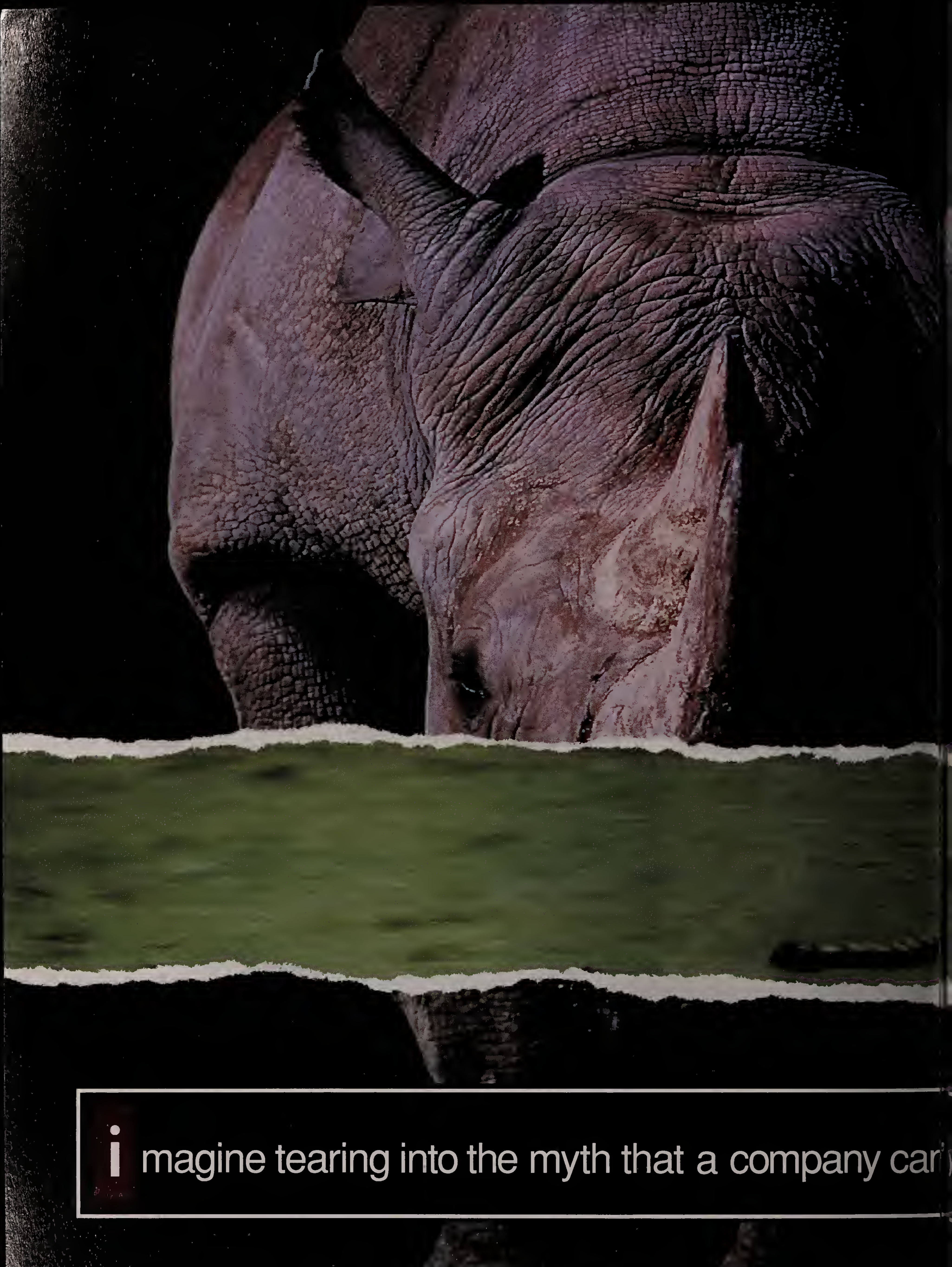
The High Points of Downsizing

ALSO INSIDE

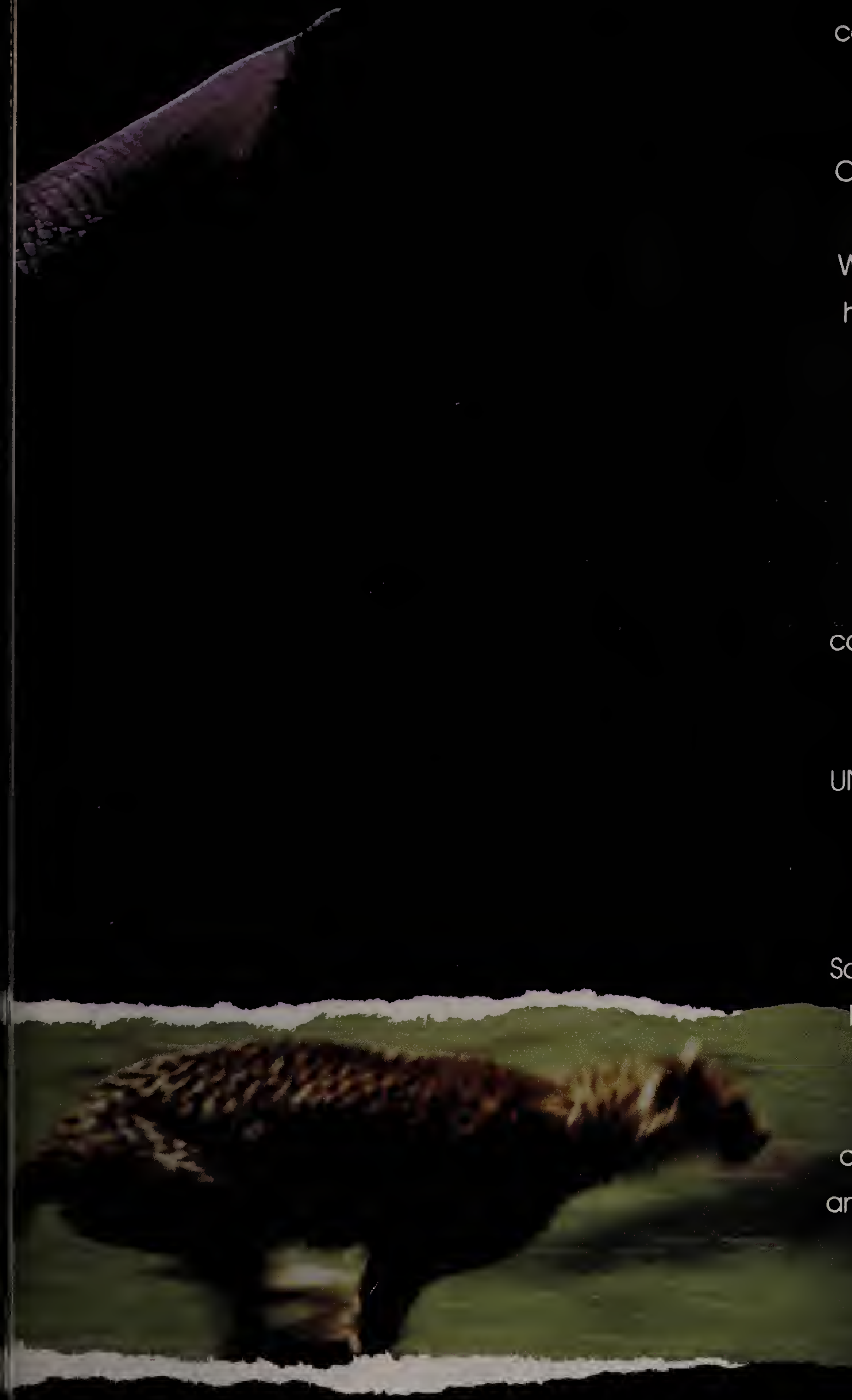
How To Draft Outsourcing Contracts That Work

WorldCorp's
Clarence E. Johnson

AN INTERNATIONAL DATA GROUP PUBLICATION



imagine tearing into the myth that a company ca



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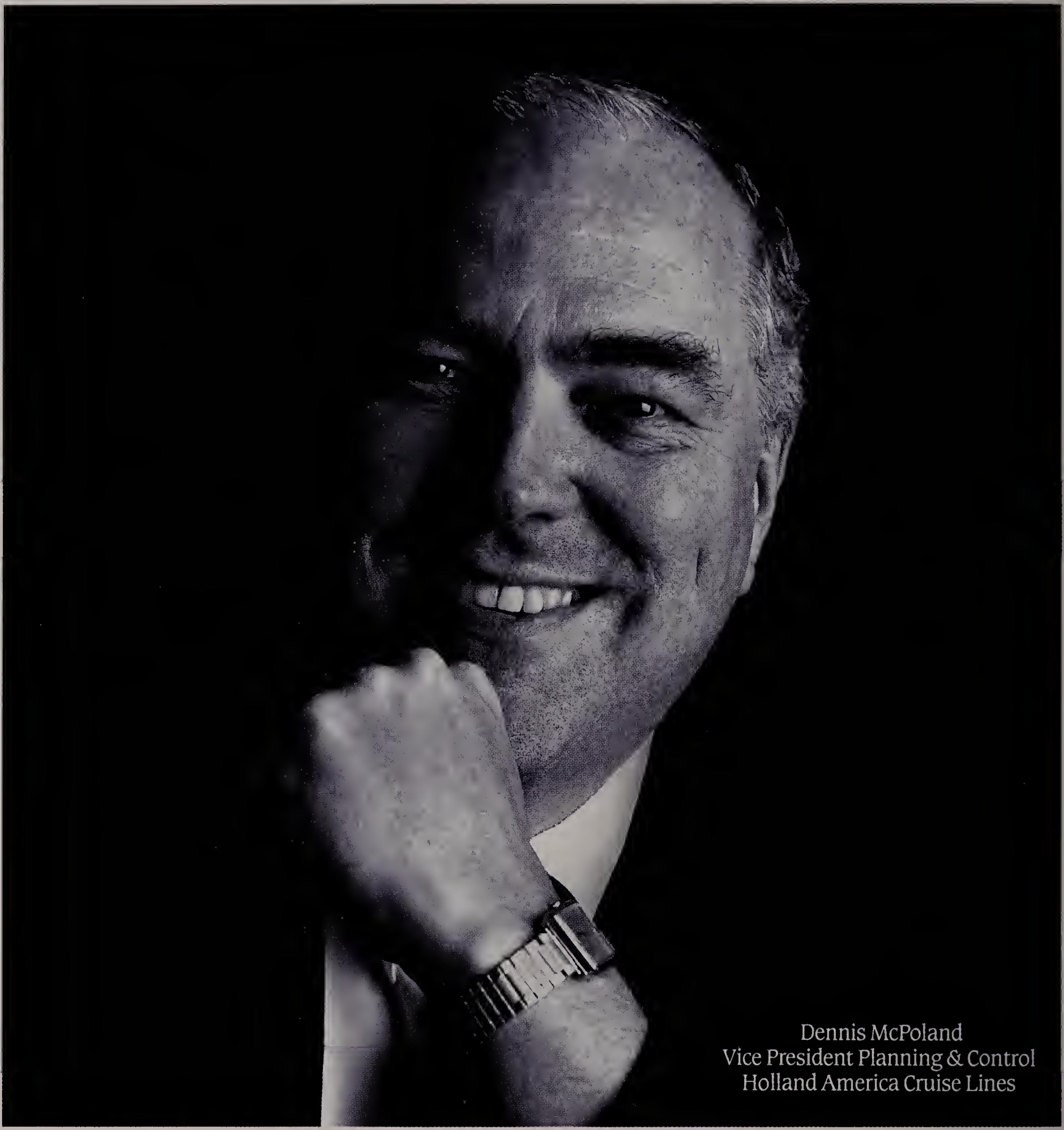

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VOLUME 6, NUMBER 13

COVER STORY

The Upshot of Downsizing 42

Companies have been running critical business applications on downsized systems for a while now. So how are things working out?

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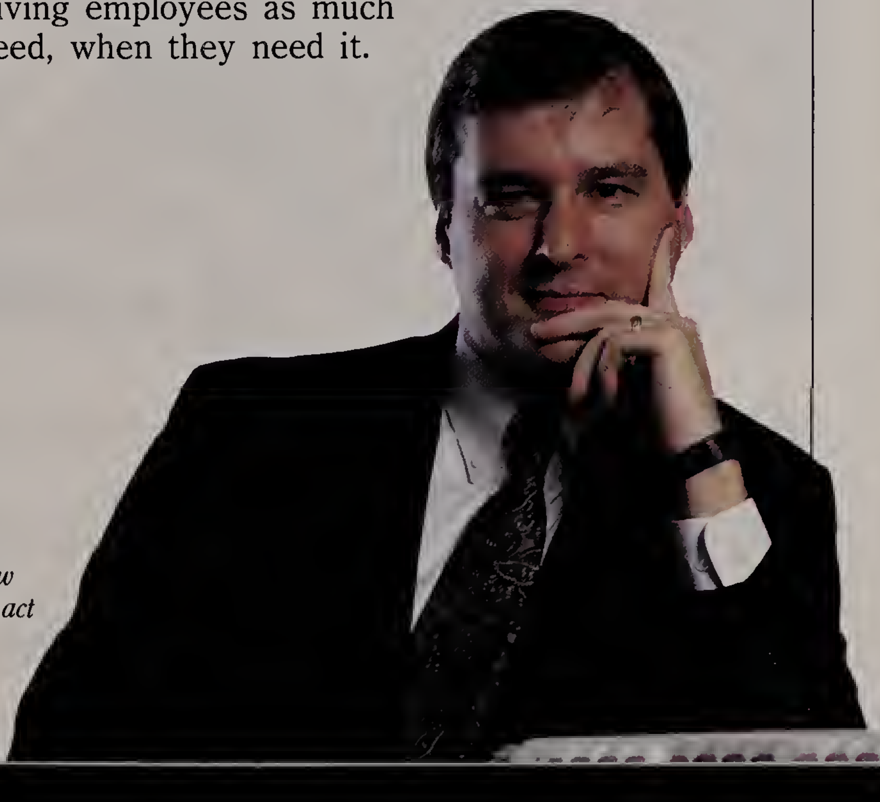
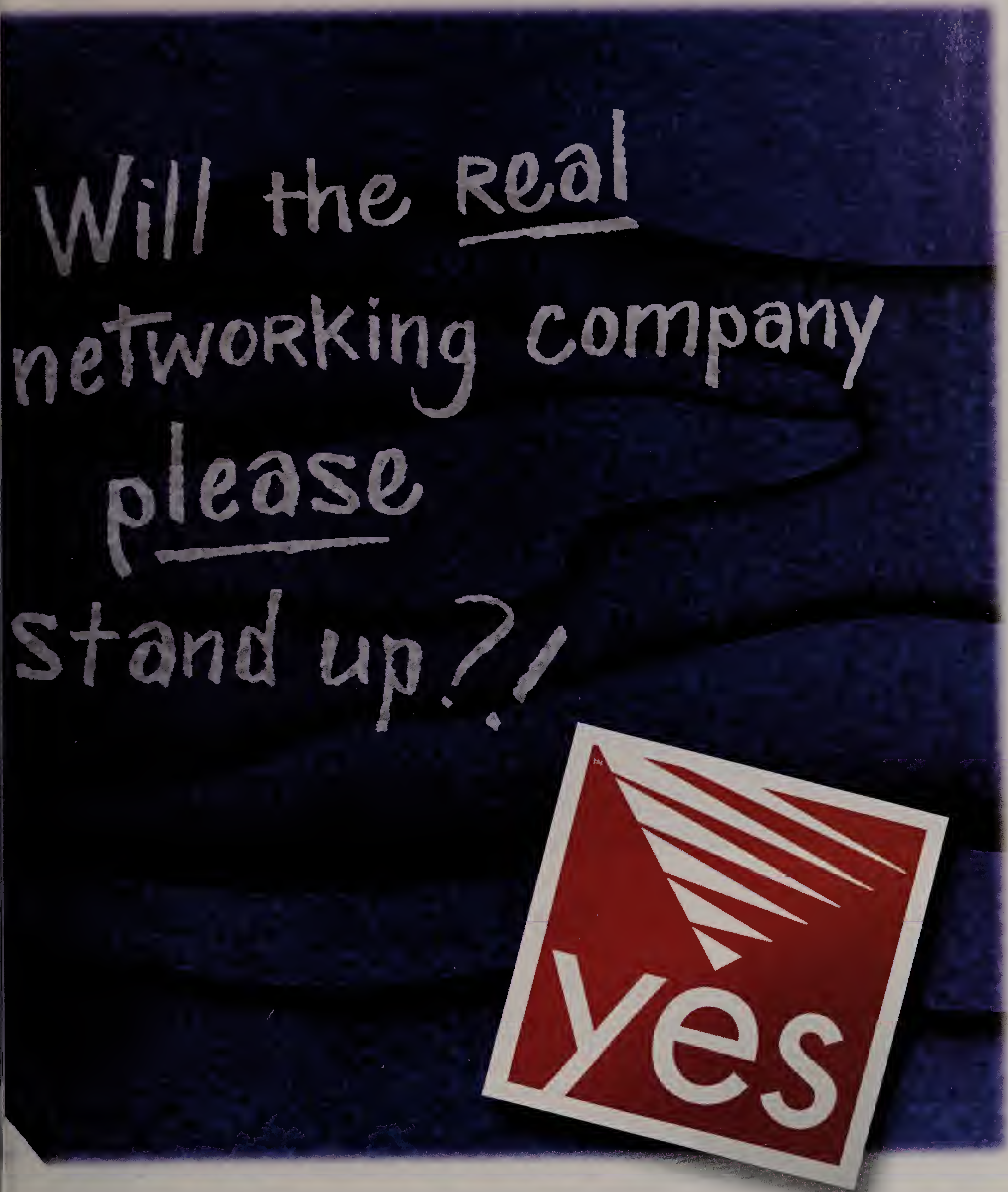


A new class act
56

MORE ►►►

Just when you were beginning to understand the old definition of networking, there's a new one. In a world where lots of vendors have figured out how to network their own products, only Novell has spent the last ten years uniting products from different vendors into one seamless information



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If IS wants to overcome its image as a poorly run and unresponsive part of the corporate structure, it must manage itself as a business and be technically pragmatic, not technically pure.
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There's much to learn and even more to love about the new releases that run atop Windows. Personal computer software is the most valuable intellectual property being created today—and this country's best hope for future productivity.
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Trucking company C.R. England & Sons is using advanced telecommunications technology to put the pedal to the metal, improving customer service and sales and cutting in half the number of support staff it needs per truck.
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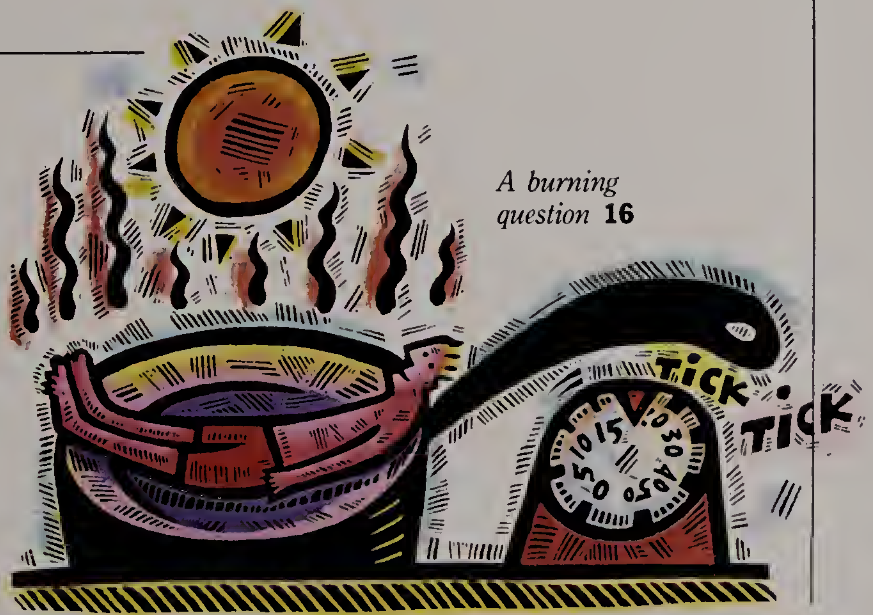

A burning question **16**

Bernard F. Curran
President
JCPenney Business Services

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With technological capabilities so advanced today, it seems downright retrogressive to be questioning the nature of business information. But that is just what many forward-thinking information executives are doing, and the endeavor is no mere philosophical exercise. Rather, it is a new way of looking at how information management can shape strategies for the enterprise.

Senior Writer Thomas Kiely reports on the CIOs, CEOs, consultants and academicians who are reconsidering what information is, and means, to a business. In "14 Key Pieces of Information," beginning on Page 48, Kiely tells the illuminating story of McDonald's restaurant magnate Ray Kroc, who observed the operation of a local hamburger emporium in California and concluded that it was essentially transportable to any location. Kroc's method may appear simplistic. But he recognized that the information he needed to shape a major business decision would not be found in the reams of data—mostly rows and columns of numbers—spewed out by computers humming in offices everywhere.

Rethinking what constitutes information has led many to conclude that tangible, solid facts must be tempered with intuition, experience and even gossip. Information can also be skewed by organizational politics. Feuds among high-level executives sabotage information sharing and consistency.

Our article provides insight into how executives have profited from confronting the information dilemma. We hope it will inspire readers to rethink how the data stored in their computer vaults can be organized and disseminated to make it more valuable to the enterprise.

Reconsidering the nature of information is an important intellectual challenge for information executives. But they still have to contend with the nitty-gritty of other organizational mandates. Two topics that never seem exhausted in today's corporate environment are downsizing and outsourcing. In her article, "The Upshot of Downsizing," beginning on Page 42, Senior Writer Meghan O'Leary gets down to the bottom-line results of downsizing projects implemented at four companies. And should outsourcing somehow have escaped your attention for the last 24 hours, you can catch up on the subject by reading Contributor Mickey Williamson's report on negotiating an outsourcing contract.

Downsizing and outsourcing are the kind of nuts-and-bolts issues CIOs must grapple with on a daily basis. The nature of information—a seemingly esoteric subject—may ultimately produce an even greater impact on the organization. *CIO* tackles both kinds of issues, because the narrow view is often the shortsighted one.

Marcia Blumenthal

PHOTO BY WEBB CHAPPELL

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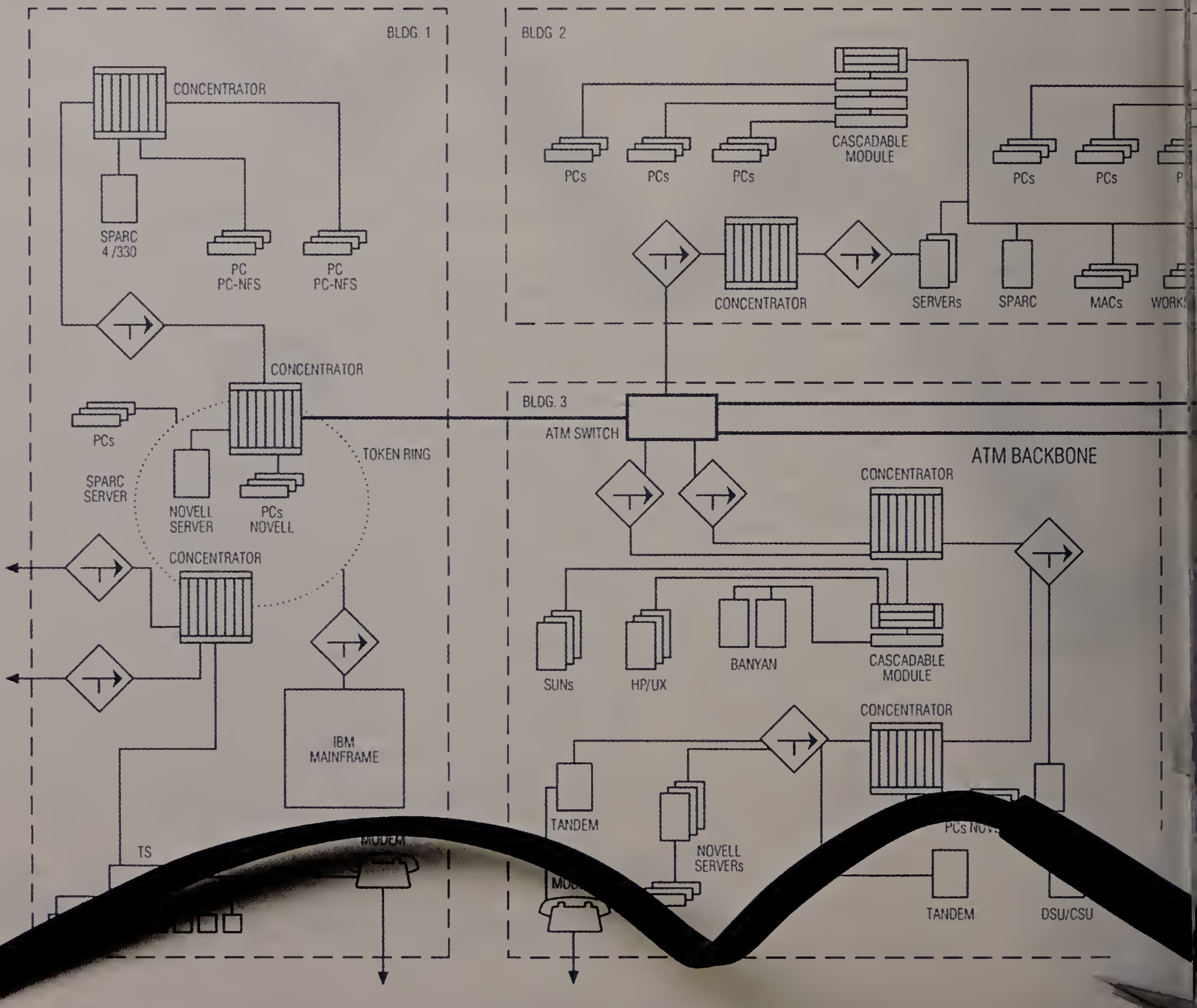

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The Network Fabric of Computing

LETTER FROM THE PUBLISHER

When trying to prove the merit of computers, Dilbert comes to the realization that they are more trouble than they're worth. I'm sure he is not alone in his assessment.

Today's executives still find it difficult to evaluate the benefits of a new information technology investment, especially when the cost of failure can be staggering. This past January, *CIO* sponsored its first ROIT (Return on Investment from Technology) Executive Retreat to enlighten IS and non-IS executives about how to measure information systems' value by looking beyond the hard numbers. A special report on the Executive Retreat, which presents the highlights from this two-day event, begins after Page 52.

Although I may not agree with Dilbert on this occasion, I remain a big fan. Maybe I'll invite him to the next ROIT Executive Retreat.

P.S. If issues like ROIT intrigue you, join us at the next CIO Perspectives Conference, "The Politics of IT: Reordering The Enterprise." The conference will take place Oct. 17-20 at the Westin Mission Hills in Rancho Mirage, Calif. Please call our toll-free registration hot line at 800 366-0246.

PHOTO BY GEORGE SIMIAN

Coming In CIO

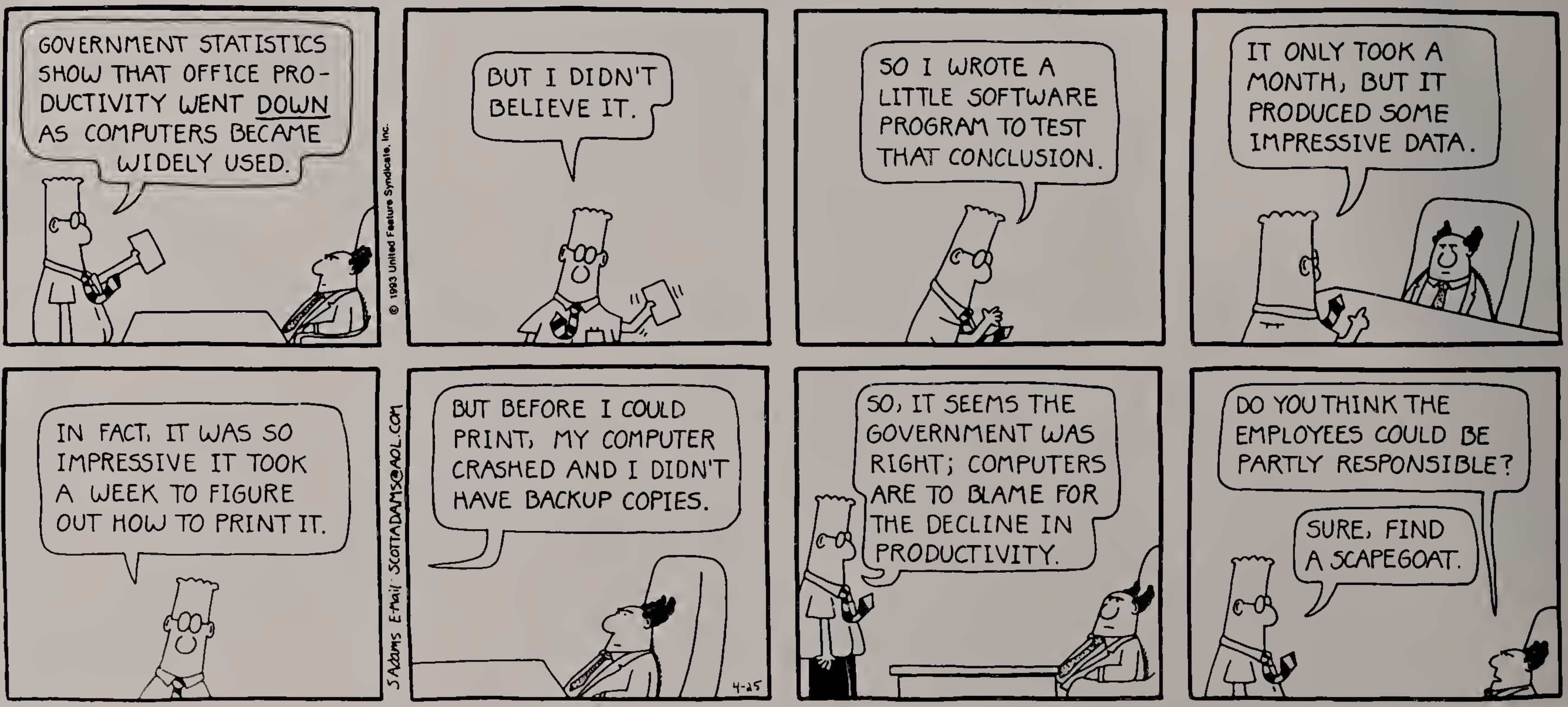
Strategic Outlook: Reengineering IS

One thing that has changed with reengineering in the past 18 months is that people are actually starting to do it. Most of the IS groups that have undertaken reengineering have done so because they faced a watershed competitive moment in which their business lives flashed before their eyes. *CIO* profiles three organizations that are trodding that troubled path.

Reinventing EDI

In manufacturing and retailing, the EDI leaders of yesterday are transcending EDI today. It's not so much that EDI is being replaced by other technologies. Rather, the very processes that EDI enabled are being eliminated, and new ways of conducting business are taking their place.

Dilbert By Scott Adams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4-25
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TRENDLINES

DIGITAL SEX

PORNOGRAPHICAL USER INTERFACES

The April issue of *NewMedia*, a San Francisco-based magazine that covers the desktop multimedia-technology marketplace, took a careful, thoughtful and well-rounded look at an especially fast-growing multimedia product area: erotica, dubbed "cyberporn." (Notwithstanding the editors' determination to present a serious, if full-figured, examination of the topic, the cover showed Tina Brownish marketing instincts: "Digital Sex," it screamed over the lurid photo of a putative cyberslut.)

The article, written by freelancer Suzanne Stefanac, traced the rapid rise of this product phenomenon—consisting primarily of CD-ROMs with such titles as *Virtual Valerie*—to the "racy e-mail [erotic mail?] exchanges" of "many a yeasty nerd and nerdette."

Besides speculating on the likelihood that burgeoning cyberporn will stimulate the sale of CD-ROM readers, sidebars considered whether there are demonstrable links between porn and the rising rate of sex crime, whether broadband delivery of arguably obscene materials will invite federal policing, and whether body-suited virtual-reality sex simulations (known to aficionados as "teledildonics"!) will be "ubiquitous and accepted as legitimate entertainment, education and therapy," according to one of Stefanac's sources.

What entertaining, educational and therapeutic CD concepts are leading this hot new wave? Consider *NightWatch*: a disk that "allows the voyeur/player to snoop around a plush singles resort via a suite of security monitors." According to the article, when *NightWatch* was being demonstrated at the vendor's booth at Macworld Expo this year, one woman attendee harangued vendor representatives, claiming that showing the product amounted to sexual harassment.

Stefanac quoted Linda Jacobson, an industry observer and editor, saying that the danger of these entertainments is that they "show men that they can have control over women. You can force them to do your bidding and they do it willingly.... [M]en have to be made aware that this kind of thing can make women feel very uncomfortable."

The product category may be offensive, particularly to women. But where there's a ton of money to be made from smut, there's no such thing as a virtuous reality. ■

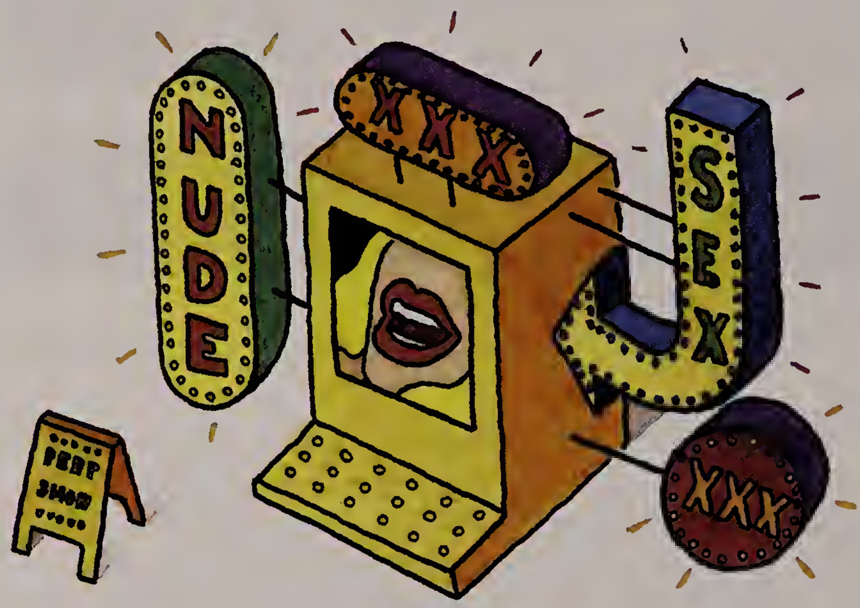

ILLUSTRATION BY JAMES KACZMAN

GIVING ENEMAS IS A CLOSE SECOND

Not surprisingly, medical professionals hate computer downtime. And nurses hate it more than anyone. That was one conclusion of a survey of 287 hospital IS executives conducted last fall by FIND/SVP, a New York-based research firm. The study, which examined the extent and impact of computer downtime in hospitals with more than 200 beds, asked respondents to name the biggest problem caused by system failures. Nursing-staff dissatisfaction came in first (18 percent), followed by lost productivity (15 percent) and delays in patient care (12 percent). Only 10 percent of respondents said physician dissatisfaction was the largest problem (although 69 percent cited it as a problem).

The study also found such institutions average 425 hours annually in planned downtime, and nearly three-quarters suffer from system failures. Hardware and operating-system software problems are the main causes of online system failure 63 percent of the time. The survey was sponsored by (but according to FIND/SVP, conducted independently of) Stratus Computer Inc. of Marlboro, Mass., a manufacturer of fault-tolerant computers. ■

A NEW PACKAGE DEAL

It's 10 o'clock. Do you know where your package is?

If you're a United Parcel Service customer, the answer is probably yes. The company has formed an alliance of 55 public cellular carriers to provide customers with immediate delivery information on bar-coded air and ground packages. Previously, this information was not available until the day after delivery.

UPS drivers capture package information and customer signatures using custom-built handheld computers called DIADs. They then insert the DIADs into special transmitters located inside their trucks; the information is uploaded through the cellular system and UPSnet, the company's global telecommunications network, to the UPS data center in New Jersey.

UPS says that the mobile data service, which cost about $150 million, is the largest of its kind in the world. The company chose cellular technology because it provided the most extensive geographic coverage, the highest reliability and potential for future upgrades. "Because of cellular's flexibility, we can continue to provide higher levels of information and better services as cellular companies mature," said Frank Erbrick, senior vice president of UPS Information Services.

UPS has accomplished "a major milestone in the development of the cellular industry," said Dale Hatfield, a telecommunications consultant in Boulder, Colo. ■

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TRENDLINES

EARLY ADOPTERS

OBJECT LESSONS

A recent study of object-oriented-technology users by Taligent Inc. of Cupertino, Calif., reveals that many corporate developers are successfully implementing the technology in large-scale, mission-critical applications. Taligent, an independent software company founded by Apple Computer and IBM, interviewed more than 100 project-team members and IS and business executives about their experiences with object technology. The following are highlights of the report, "Lessons Learned from Early Adopters of Object Technology."

Educate management and recruit a high-level sponsor. Management must understand the technology to support it.

Set appropriate and conservative expectations. Build in a cushion of time and money, and sell the long-term vision. Many companies found that their immediate results were less dramatic than expected. Object reuse, often the main motivation for choosing the technology, was usually not possible until after a couple of projects.

Learn from experience. Before beginning, speak with peers who have launched similar object-oriented projects. Project teams should expect analysis and design to be difficult and should seek outside help. Vendors and consultants often have valuable experience.

Work in small, geographically close teams. Five people is the ideal size. Break larger applications into subsystems and assign them to subteams. Target developers based on personal motivation and intellectual curiosity.

Invest in training. Plan for new roles, such as object analysts and designers, architects and object librarians.

Target applications that will fully leverage the power of object technology, such as small, mission-critical applications or complex, interactive applications.

Consider building an enterprise model to help identify common sets of objects used throughout a company. Develop new organizational structures to promote reuse of objects when possible. Tie performance reviews and compensation to reuse rather than new programming.

Choose a language based on the preference of the corporate champion, experience of the project team, consultant recommendations, availability of tools and platform choice, as well as the features of the language itself.

Take advantage of object technology's reusability and build the actual application from the components of the prototype.

Review design and coding regularly to ensure consistency and good programming practices at every stage.

Focus on performance early. Develop reliable metrics that will help to measure a system's true performance. ■

EXPRESS YOURSELF

In the hopes of lowering costs, improving service and increasing business, Federal Express Corp. is borrowing a time-tested idea from the banking industry. The Memphis, Tenn.-based package-shipping company has begun rolling out On-Line, a system of automated, self-service kiosks that feature magnetic-card slots and terminals similar to those of ATMs.

ILLUSTRATION BY FRAN O'NEILL

Anyone with a credit card or Fedex account number can use On-Line to prepare letters or packages for overnight or two-day delivery. Equipped with touch-tone, menu-driven screens and linked with a private telecommunications network, the kiosks enable users to generate bar-coded labels, perform billing transactions and relay routing information to a regional office. Once a package is labeled, the user deposits it in a drop-off box for pickup by Fedex employees.

The kiosks are designed according to Fedex specifications and run software developed in-house. The system is not seen as a replacement for the company's 1,375 staffed centers, but it may replace some of the 29,500 drop boxes located in office buildings. According to the company, On-Line will cut down the number of packages that are lost or erroneously delivered because illegible handwriting will be eliminated. ■

WE ARE HONORED...

At the eighth annual Computer Press Association awards ceremony, held in New York in April, *CIO* was honored as the best technology magazine in its under-100,000-circulation class. Judges from *The Wall Street Journal* and *BusinessWeek* hailed *CIO* for its stylish and interesting presentation of a broad range of subjects. Runners-up in the class were *NewMedia* (see "Pornographical User Interfaces") and *VARBusiness*.

International Data Group, *CIO*'s parent company, had an upbeat day overall at the awards. Besides *CIO*, honors went to *Macworld* as the best magazine with a circulation of over 100,000, and to *Computerworld*, which was voted best newspaper in the large-circulation class. In addition, IDG's book-publishing division won in the category of best advanced how-to book on systems (*Macworld Music and Sound Bible*, by Christopher Yavelow) and was a runner-up in two other categories.

The Computer Press Association awards have been sponsored for the past eight years by Citizen America Inc., which is ending its sponsorship after this round. Thus, the CPA is shopping for a new angel. If readers have any ideas, they can contact awards coordinator Hal Glatzer at 212 620-8190. ■

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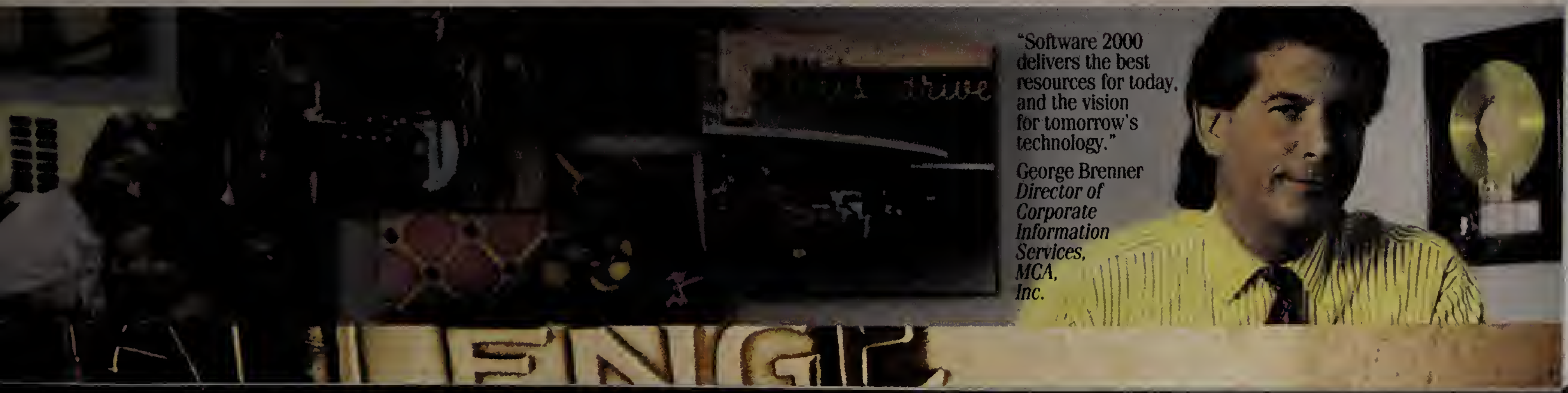
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TRENDLINES

CONTINUING EDUCATION

A DEVELOPING CURRICULUM

We've all been inundated with dire predictions about the future of America's IT industry. The current state of education is woefully inadequate, and prognosticators say that the one bright spot where we still outperform our rivals—namely software development—is destined to go the way of the semiconductor and auto industries if things don't improve.

Well, Purdue University in West Lafayette, Ind., is not taking these warnings lying down. In partnership with IBM, the university has designed a seven-course software-systems-development curriculum for undergraduates. Using a fully configured, 486-based lab, computer-science students get hands-on experience in the latest development tools and methodologies from the likes of IBM, Viasoft, KnowledgeWare and Microfocus. According to Purdue, graduates of this program require less development training when they start their first jobs in the real world.

Purdue also hopes to train professionals currently working in development. The newly revamped undergraduate curriculum is being used as the basis for a continuing-education program that Purdue hopes to launch this summer. Plans exist to offer intensive workshops designed to educate working developers in the use of leading-edge technology. "We're concentrating exclusively on application-development courses right now," said Professor Jeffrey Whitten, who is hammering out the details of the program. "Our primary objective is retooling application developers to maximize the use of CASE tools."

As defined by Purdue, CASE encompasses reengineering, client/server and reverse- and forward-engineering. The first course will concentrate on data and process modeling, what Whitten describes as "an engineering graphics course for information systems professionals."

If the retraining program ends up mirroring the regular curriculum, additional courses will include modern analysis and design, prototyping code generation, redeveloping legacy systems and managing systems development. "Ultimately, we'd like to offer a strategic-systems planning course," said Whitten.

The formal decision to offer the retraining program has not yet been made, because textbooks are hard to come by. Nevertheless, Whitten is cautiously optimistic that a seven-to-10-day course will be in the offing at the end of July.

More information is available by contacting Whitten at 317 494-4545.

CAREER MOVES

EDWARD R. DIAMOND has been named chief information officer and vice president of the New York-based publisher Matthew Bender & Co. Inc., where he will be responsible for developing information systems to integrate all departmental operations. He was formerly the group vice president for systems and technology at Simon & Schuster.

Russell Reynolds Associates Inc., a global executive-recruiting firm, has appointed **ROBERT H. FLAST** as chief information officer. Formerly the vice president of information systems for Metropolitan Life Insurance Co., Flast will be responsible for enhancing the capabilities of Russell Reynolds' information and research services.

LIBRARY SCIENCE

Some technology-dependent businessfolk can't write their names without a spell-checker or use a pen that isn't attached to a palmtop computer. Imagine their dismay when faced with the prospect of doing research in a traditional library, where ink-stained wretches scribble on yellow legal pads and students make surreptitious notes in the margins of the books.

The New York Public Library's new Science, Industry and Business Library, on the other hand, will be the kind of place Judy Jetson would visit if she were studying for her MBA. Scheduled to open in the fall of 1995, the library will house 100 computer workstations where users can tap into internal and external business and science databases, networks and bulletin boards worldwide, including Internet. A 26-workstation electronic-information training center will offer lessons in database technology. Even the reading-room tables will be wired so that users can plug in their own laptop computers. Thanks to round-the-clock dial-in access, the library will never close. Eventually the system will be linked to the NYPL's 82 branches.

Almost as staggering as the scope of the new library's collection and services (see Trendlines, April 1, 1992) is its cost—$84 million for renovation and construction, and a $16 million endowment, income from which will support the library. The Campaign for the Science, Business and Industry Library is headed by Louis V. Gerstner Jr., the new chairman of IBM.

ILLUSTRATION BY JAMES KACZMAN

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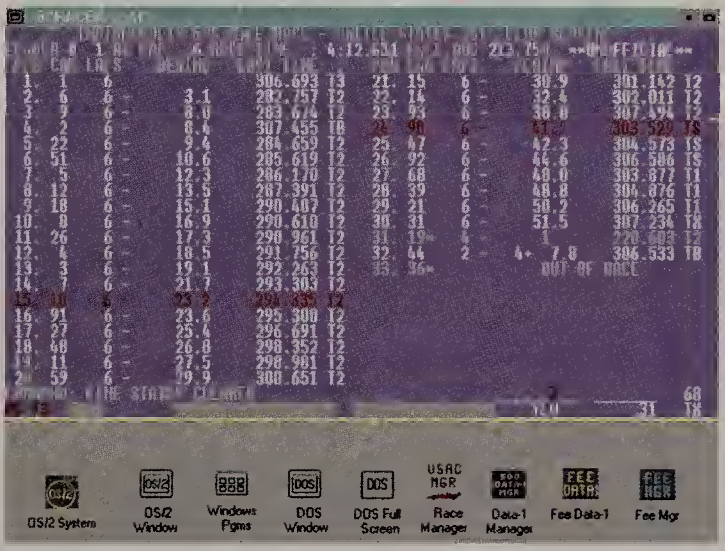

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The Business of I.S.

If IS wants to overcome its image as a poorly run and unresponsive part of the corporate structure, it must manage itself as a business and be technically pragmatic, not technically pure

BY CHARLES C. FRANCIS

CIOs are faced with a choice: They can accept the corporate mantle of leadership with respect to business processes, information and automation and be soldiers of change. Those who don't will be unable to provide the service or value needed by the company from the IS organization, thereby failing both the corporation and the IS staff. These are the soldiers of MISfortune.

IS executives must dare to help lead their companies in directions that are less comfortable but more profitable, and their staffs in directions that are less secure but provide better service. No one other than the CEO, or possibly the COO, has a better view of the entire business than the corporate CIO and his or her staff. Others may supply the corporate vision and inspiration, others may process transactions, and others may provide the financials, but the IS executive and staff are uniquely positioned to see and understand the business from front to back.

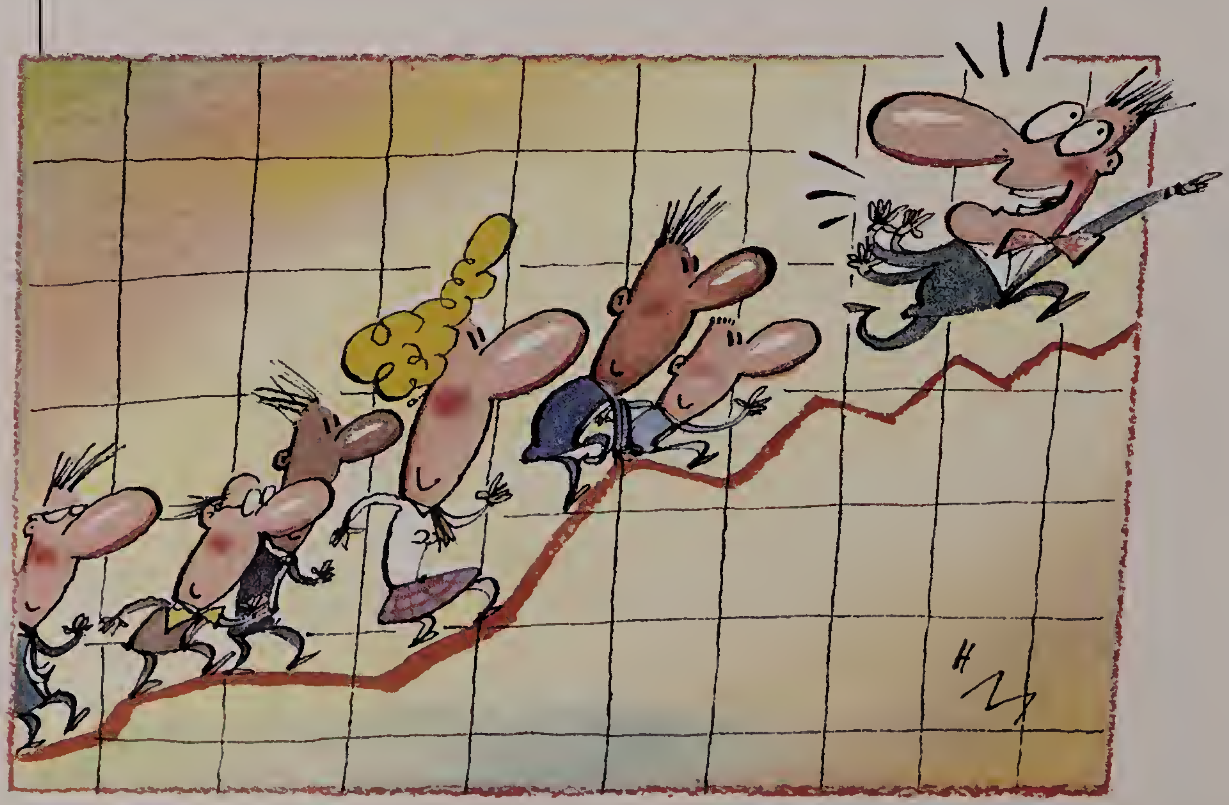

ILLUSTRATION BY HAL MAYFORTH

To take advantage of this broad view, the IS organization must understand fully how the business works: what events must occur for it to run and what causes those events to happen. With this knowledge, the CIO and the IS team can take a leadership role in defining, building, reengineering and automating business processes. The issue is not whether to be involved but how.

Establish a platform from which to operate. IS is rarely at the top of any corporate executive's list of favorite departments, and there seems to be a congenital inability for IS and the other departments to communicate successfully with each other. To build credibility, it's important to show results.

Big projects and high costs are hard to sell. So are big changes. What work better are small, low-cost, high-benefit, high-visibility projects that excite and energize the users. Our head technical wizard in charge of strategic systems planning calls them "5 percent solutions." They build bridges throughout the organization because they create recognizable benefits that users understand and like. Examples of initiatives used for this purpose in our organization were a modest imaging implementation, an executive information system and E-mail. We also initiated some cost-cutting measures that did not cause a lot of turmoil.

When well-implemented, these smaller projects help to establish IS's credibility with both users and management. This leads IS to the next step: proposing and selling companywide, higher-impact and ineluctably higher-cost projects. These projects are much more likely to touch off changes that cross departmental lines. This sometimes creates reluctance—even truculence—among users. The IS executive's credibility with top

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management is especially critical now.

Drum up support from both users and top management. When user departments resist change, IS will try to convince the CEO that the users just want to protect their turf. They, on the other hand, will claim that they are only trying to safeguard the business from bad procedures or a perceived IS boondoggle. As more and more change occurs, it is almost certain that at least some of the affected staff will try to counsel the CEO that the crazies in IS are ruining the business. After all, it is a common view that IS is made up of a bunch of business-know-nothing "techies" who are loyal only to technology and not to the interests of the corporation.

This animosity is caused, in part, by fears that IS staff who are genuinely knowledgeable about some area of the business might be able to streamline users out of a job. This is a valid concern, and it is perfectly normal for people to fight change soldiers to protect their jobs. So while doing what is best for the business comes first, we must also help users overcome their fear.

> *These "5 percent solutions" build bridges throughout the organization because they create recognizable benefits that users understand and like.*

Concentrate knowledge in the IS organization. Good service plus good business knowledge plus good technical knowledge equals success. If any one element is bad, then there is only failure.

What makes IS valuable to the corporation is the service it provides. No service, no value. Because much of the service we provide is internal to the organization, we often do not feel as compelled to do a good job. We must impress upon our staffs the proper meaning of service and make certain that they see the benefits that accrue to the company by providing exemplary service.

But being service-oriented is not enough. When IS staff are business-ignorant, misunderstandings of business processes or required business events will inevitably cause prob-

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lems at some point in the project life cycle. Every day, IS professionals fail because they blindly follow (or give) directions that are detrimental to the business, or accept user requests for automation that make no sense at all. With sufficient business knowledge, IS staff can intelligently challenge bad directions and poorly thought-out requests and guide users into good decisions.

The best way for IS staff to get the required business knowledge doesn't receive much attention. That is the co-location of users on IS teams during a project life cycle. Under this arrangement, users and IS staff are involved together in project tasks and constantly transfer knowledge back and forth. This not only ensures a proper business focus; it also helps break down departmental and political barriers.

Technical expertise (not technical bigotry) is assumed within the IS organization. If you have good technical expertise and can effectively disseminate it throughout the IS organization, you can succeed. Without it, failure is certain. Enough said.

Manage your own shop well. While we often have good reasons for being late or over-budget or for providing bad service, the corporation has neither time nor tolerance for such explanations. We are the ones who accede to the "galloping" scopes—those unregulated demands for increased functionality that users tack on to system specs. And we are the ones who become so enamored with a technology that we must have it at all costs.

To correct this, we must manage by business principles. If additional functionality is requested for example, we have to play a key role in determining if it is worth it or not. We cannot just create a new application without considering its relation to other systems and plans or whether it can be integrated. We are charged with giving users what they need, not necessarily what they say they want. When the two coincide, fine. When they do not, we have to stand firm.

IS is a big expense to corporations, and all the rules of thumb—that our budget should be 1, 2, or 3 percent of revenues, for example—do not amount to a hill of beans if we are spending too much for the bottom line or not producing the results the business needs. We must manage our IS organizations as if they were businesses. We have to be technically pragmatic, not technically pure, and we have to keep our assets under control. If we do not, we will be stripped of our responsibility to lead. We will also lose a golden opportunity to be a vital part of our business.

Charles C. Francis is vice president of the information services group and CIO at Comdisco, a high-tech leasing, asset-management and business-continuity company based in Rosemont, Ill.

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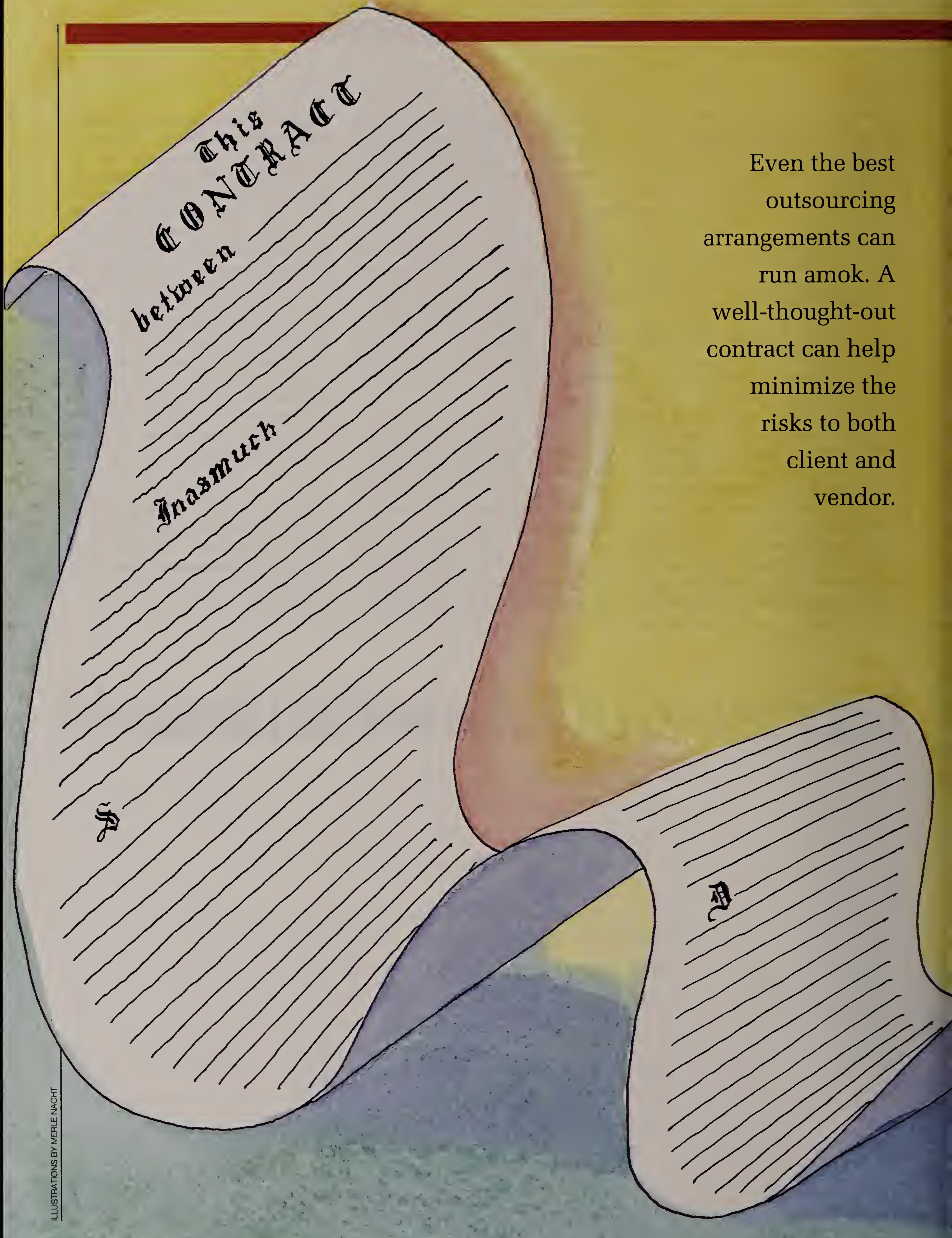


Even the best outsourcing arrangements can run amok. A well-thought-out contract can help minimize the risks to both client and vendor.

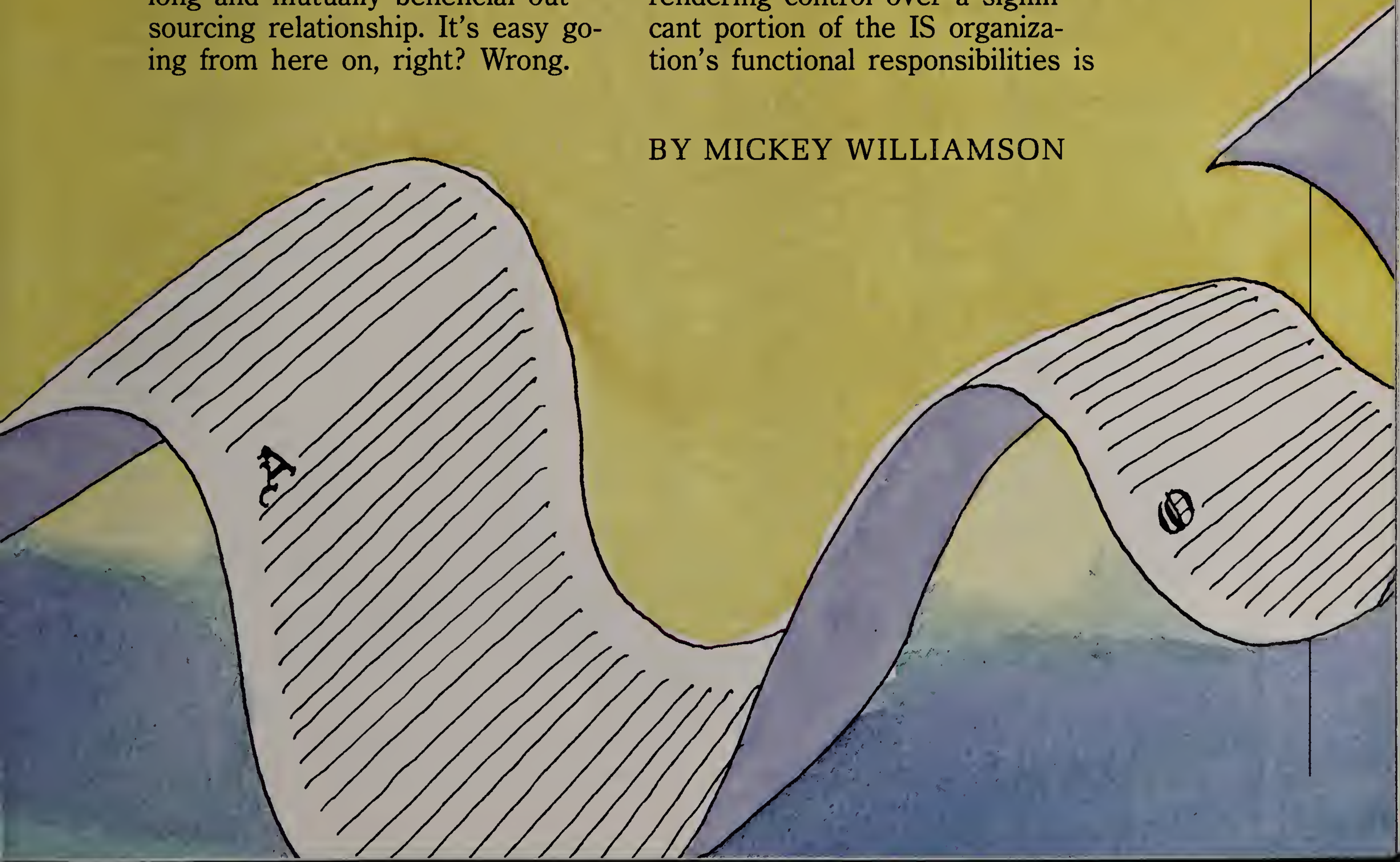
ILLUSTRATIONS BY MERLE NACHT

OUTSOURCING TERMS OF AGREEMENT

The worst, you think, is over. You've trudged across the desert of deciding whether—and what—to outsource. You've slogged through the swamp of vendor selection. Now all that remains is to cross the plateau of contract negotiations. On the horizon you can see a long and mutually beneficial outsourcing relationship. It's easy going from here on, right? Wrong. Along the trail lie hazards that give new meaning to the word "pitfall."

There are risks for both client and vendor, according to Bob Forman, president of IMI Systems Inc., a transitional outsourcer in New York. Proportional to the risk the client assumes by surrendering control over a significant portion of the IS organization's functional responsibilities is

BY MICKEY WILLIAMSON



"You have to know what you're willing to settle for. In the ordinary course of life, six seconds is rather fast, but on the telephone it's an eternity."

–Leslie Srager

the risk that the vendor incurs by taking on those responsibilities, Forman said. The desire to manage those risks is a powerful motivator on both sides during contract negotiating sessions.

Performance issues often take top priority when the contract involves using an outside data center. The fact that the computing facility has been moved should not be evident to those in the business areas as they work. "You want to know that not too much time elapses from the time you enter a command on your terminal until you get your response," said Leslie Srager, partner at the New York law firm of Phillips, Nizer, Benjamin, Krim & Ballon, and a specialist in outsourcing contracts.

There's the first rub: Defining "not too much time" is one of the trickier tasks awaiting negotiators on the trail to a contract. "You have to know what you're willing to settle for," said Srager. That means knowing what users are accustomed to and what industry standards exist. The vendor can expect response-time requirements to differ from one application to another. A few seconds may be acceptable for a complex database query, but if the outsourcer is managing your telephone system, users will expect the dial tone to be there by the time they get the receiver to their ears. "In the ordinary course of life, six seconds is rather fast, but on the telephone it's an eternity," Srager noted.

Setting performance requirements was a major consideration for J. William Anderson, senior vice president at investment broker Kidder, Peabody and Company Inc., in New York, when he negotiated a contract with Automatic Data Processing (ADP) Inc., of Roseland, N.J. "I think it's important to get down to the tenths and hundredths of seconds when you're talking about performance criteria," he said. Anderson stressed the need for agreement on an objective way of measuring performance, "whether it be software that you build, hard-copy reports that are generated or logs that are kept."

Availability and downtime are related issues. Practically every computer has shut down at some time because of a software problem, hardware failure or garden-variety power outage. Outsourcing clients need assurance that the computer will be there when they want it, which means specifying the hours during which it will be available and getting the vendor to guarantee that the computer will actually be running some percentage of that time.

Where software-development services are involved, customers have a right to expect the vendor to warrant that work will be done "in a workmanlike, professional manner," said Forman. Quality metrics—errors per thousand lines of code, for example—are not commonly a negotiating issue. Software quality issues today have more to do with satisfying customer requirements, according to Jack M. Cooper, vice president and CIO at Joseph E. Seagram & Sons Inc. in New York. The change is due, at least in part, to improvements in software-automation technology. "In the last two years, errors in code have diminished significantly," Cooper noted. "Now the [quality] issue concerns clarification and completeness of the statement of requirements."

Careful attention to defining requirements can pay off in pricing as well as quality, according to Roy Wetterstrom, managing partner at New York-based Micro Modeling Associates Inc., a firm that specializes in rewriting end-user applications to run under Microsoft Windows. "If I sense that three-quarters of the way through a [development project] the client is going to start changing their mind, I'm going to put more cushion into the price," he said.

Exactly what constitutes a software error should be a subject of intense scrutiny during negotiations, according to Wetterstrom. Sometimes whether the customer is asking for a bug fix or an enhancement to the software is a matter of perspective. "That type of issue presents an interesting challenge," he remarked.

Just as important as quality standards in the outsourcing contract is the vendor's commitment to fix problems and supply service promptly when problems arise. "Our clients want to know if we are going to be able to respond in the middle of the night if there is a problem," said Forman, "and if a major change has to go in, are we going to be able to work over the weekend."

The contract should classify problems according to their severity and then assign to each category a required response time, Kidder, Peabody's Anderson noted. "Unless you get into this kind of nitty-gritty detail during contract talks, it's not something the vendor is likely to offer. You've got to negotiate to get around-the-clock response if the application or service is that critical." Similarly, said Cooper, the contract should include assurance that someone will be staffing the help desk in the outsourcer's data center at all times when the customer

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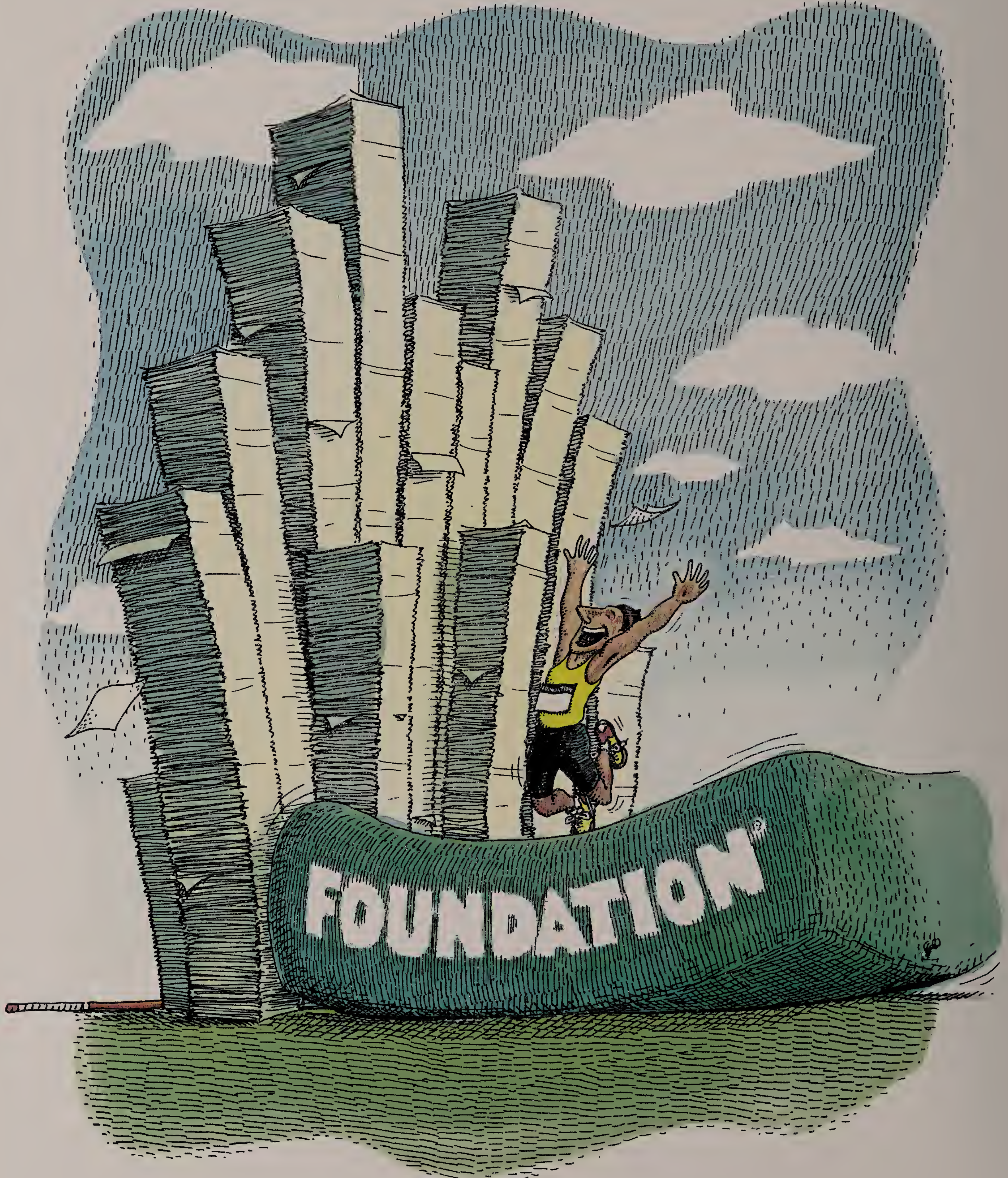

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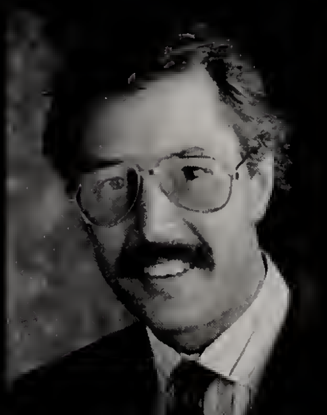

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- **Risk management:** What provisions are there for preventing unauthorized access? For disaster recovery? Is there a backup facility? System redundancy? Under what conditions would you have access to operating-system source code?
- **Confidentiality:** Is there a clause detailing the confidentiality of your proprietary information?
- **Intellectual property rights:** Does the contract put restrictions on the use of code or routines? Under what circumstances?
- **Remedies:** If something goes wrong, will the outsourcer pay damages? Penalties? Is there any provision for conflict resolution?
- **Personnel issues:** Does the contract restrict attempts to hire away the other party's staff? If some transfer of staff is agreed to, will the employer's contractual obligations be honored?
- **Termination:** Does the contract define procedures for the transfer of property/responsibility if performance is unsatisfactory? If the business is terminated by either party?

–M. Williamson

might need to call.

Matters of knowledge transfer and training must also be addressed, said Wetterstrom. Micro Modeling prefers to train its clients to support their own applications. Customers who cannot provide appropriate staff should expect to negotiate a support contract as part of the deal, he said.

Anytime software is involved, there should be some provision for gaining access to its source code in case the vendor goes out of business. Most customers simply stipulate that the code and a developer who knows it well will remain available for some period after the system is installed. Some require that a copy of the source code be held in escrow by a neutral third party, although, Cooper remarked, "if I've got that much concern that [the vendor] is going out of business, then I should really wonder why I'm doing business with them in the first place." Still, he added, "with today's economic turbulence and international excitement, one certainly has to be protected."

When it comes to protection, nothing is more important than provision for disaster recovery, according to Anderson. "I think it's critical that you expect any outsourcing vendor to have in place a second facility or some type of process that ensures they will be able to recover the services they are providing in case of a disaster, whether it be caused by weather, fire or an act of terrorism," he said.

Because outsourcers often handle proprietary information, customers also want protection from breaches of confidentiality. "Typically we sign a confidentiality clause with the customer," said Forman. "Then we have that same language in our contract with our employees."

Wetterstrom touched on another sensitive issue in negotiations: the question of intellectual property rights. "We require that our clients keep our code and internal routines confidential [and] for internal use only," he said. "They are not allowed to distribute their applications, except by very special arrangement." Such exceptions should be spelled out clearly in advance.

Anderson pointed out that clients often supply their vendors with ideas that deserve protection as well. "If you come up with an idea that involves competitive advantage, you've got to protect that, [or at least] have first say on what is done with it," he said.

The outsourcer may not agree. According to Wetterstrom, clients sometimes "try to slip into the confidentiality section a provision that we cannot create a similar type of application for a competitor without their prior written consent. We absolutely will not agree to that, ever. If we had that kind of arrangement with our clients, we could only have one client."

Personnel issues can get touchy, too. Clients sometimes try to hire members of the outsourcer's staff, particularly if the

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Anytime software is involved, whether it is provided by the data-center outsourcer or developed especially for the client, there should be some provision for gaining access to its source code in case the vendor goes out of business.

deal involves development of new software, and vendors often feel the need to protect themselves from a raid of their personnel. "We usually have a mutual no-hire provision in the contract that says that I won't hire your people if you won't hire mine for some period," Forman said. "Otherwise they will try to hire our best people, and that's our bread and butter."

Sometimes, Forman noted, some of the client's employees are transferred to the outsourcer's staff as part of a downsizing arrangement. Or the client hires, with the vendor's approval, someone who helped develop the new application. "That raises the question of the new employer's assumption of the former employer's contractual obligations in matters such as pension plans," he said. He also cited a more subtle risk: Suppose one of the client's employees accepted an incentive package as part of a downsizing plan and is now working at the client's site, but as an employee of the outsourcing vendor. "What problems does this create with other employees at the client's site? This should be covered in a contract provision," Forman warned.

Personnel issues "must be very carefully reviewed [from both] a personnel and a legal standpoint," Cooper said. "Any slips in that area can be financially very damaging and very hard on the individuals involved." When it comes to this point in negotiations, not only the client company's lawyer but also a human-resources professional should be at the table, he added.

Eventually, negotiators will get around to the subject of liability and damages. Lawyers come in handy when it comes time to bring up unpleasant subjects such as the vendor's failure to deliver or the existence of software errors that cost the client significant sums of money. "Of course...vendors want to have as little liability as possible, and clients want them to have as much liability as possible," Srager said.

Some vendors will accept liability for direct damages—costs incurred as an immediate result of error. Often, Srager said, contracts set a ceiling on the amount for which the vendor will be liable. More rare are situations in which the vendor accepts responsibility for consequential damages—one step removed from direct damages and therefore "a fairly nebulous concept," Srager explained.

Some vendors simply refuse to accept liability provisions. "We're not in a position where we can accept liability," Forman explained. "If one of our programmers inadvertently leaves a bug in a program that blows up somebody's billing system, the error can be much more than our net worth." The larger the client company, the more likely it is to recognize this. At worst, Forman said, his company may be asked to post a liability bond with a clearly defined upper limit to damages.

Provision for conflict resolution and an escape clause if all else fails round out the list of concerns that must be addressed during negotiations. The first line of defense against dispute is a good working relationship between vendor and client company staffs, according to Forman. A contract may specify who will make the first attempt to solve the problem and under what circumstances people at higher levels in each organization will be brought into discussions.

Eventually all contracts come to an end, and one side may decide it's best not to renew. "You'll want to get some help with the transition from the vendor you're leaving," Srager pointed out. "If you have foresight, you try to have provisions in the agreement that deal with that kind of situation. You don't just wait for the end."

Anderson, who managed the switch at Kidder, Peabody from Quotron Systems' stock-quote-retrieval service to ADP's, said that "deinstallation or termination clauses that protect your interests" are critically important. "You want to be sure that you are not going to have to write some large checks to pull out equipment or get rid of your service. Even though you sign a five-year deal, it doesn't mean that at the end of five years everybody waves at each other and says goodbye. It's not that easy." Anderson said the contract with Quotron covered 10 pages; the one with ADP is nearly 100 pages. "And it isn't all lawyer mumbo-jumbo, either," he said. Among provisions he has added this time are those dealing with the addition and removal of offices, downsizing and the acquisition of another firm.

However long the contract, Forman said, the goal should be never to have to consult it once it's signed. "You lay out the terms, and then you put it away and hope that you never have to look at it again. In the best of contracts, you think through the issues ahead of time, and you never pull it out to go to court."

Mickey Williamson is a technical journalist in Warwick, Mass., who specializes in emerging technologies. She heads the Qwerty Group.

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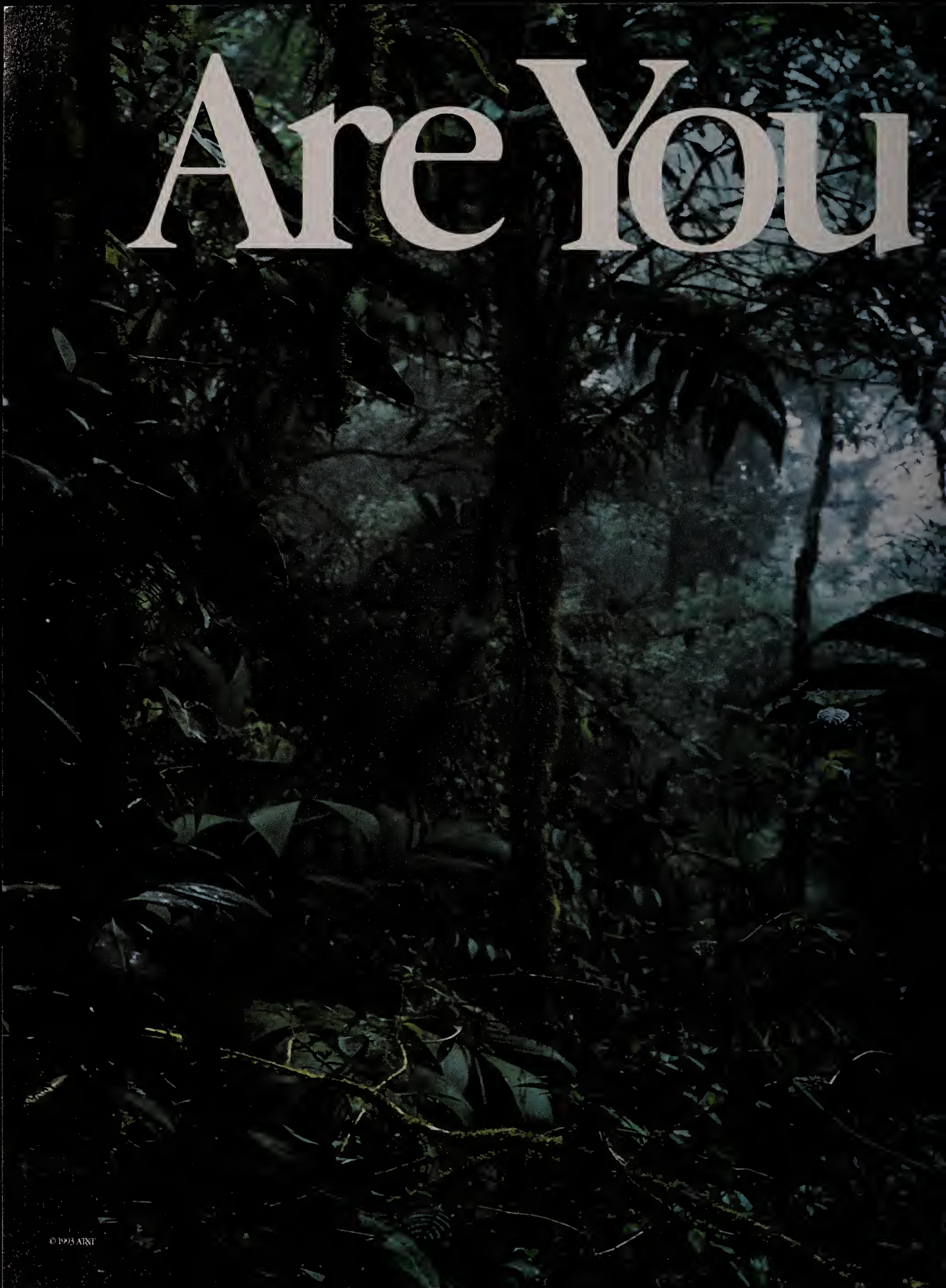

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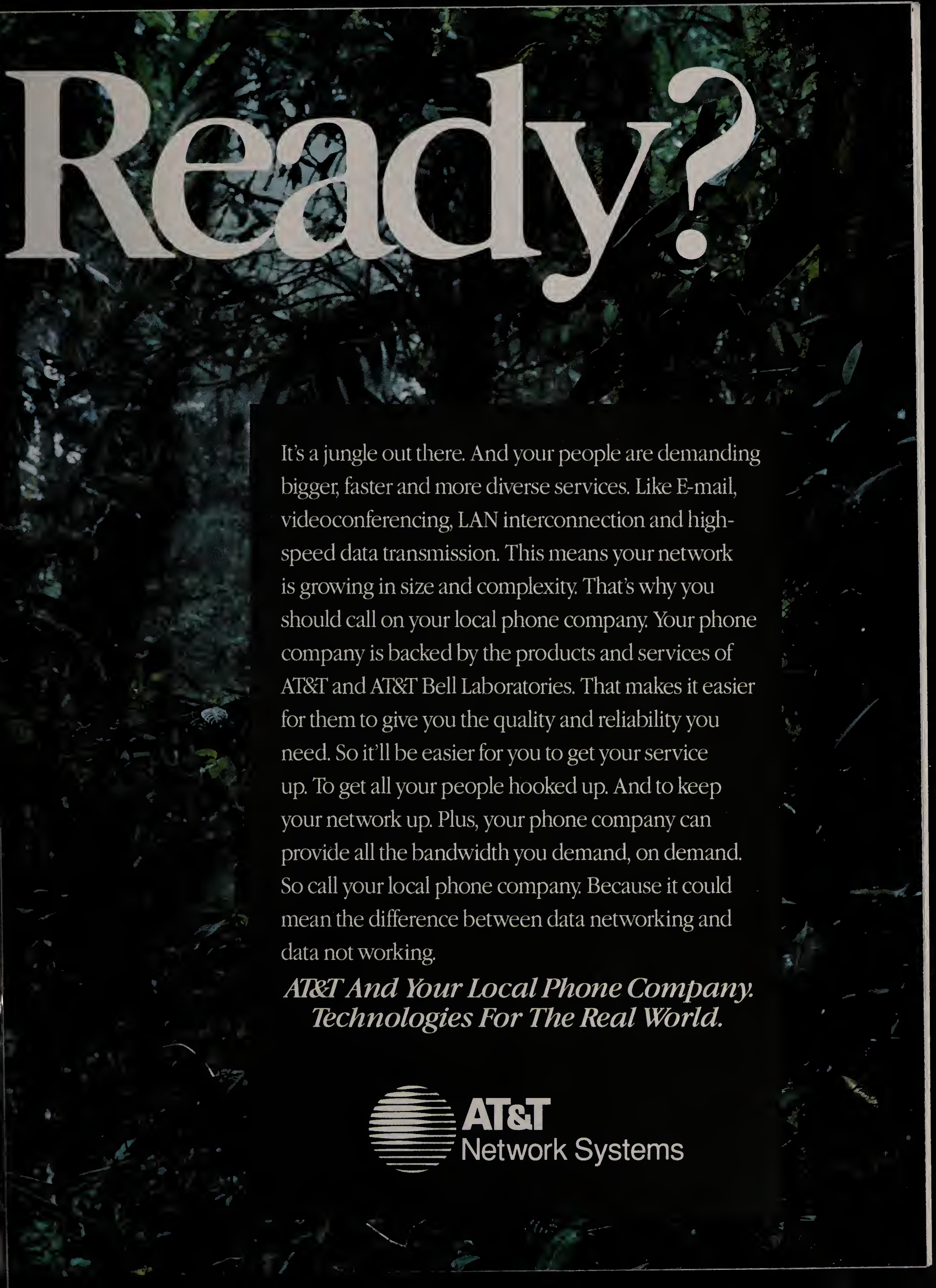

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TEXAS INSTRUMENTS

THE UPSHOT OF DOWNSIZING

BY MEGHAN O'LEARY

Downsizing projects generally spring from simple roots: the need to save money, improve speed of delivery or response, or develop a more flexible information system. As the following four companies have discovered, the benefits of moving to nimble, more responsive platforms can be unexpected and far-reaching. By supplying users with new, more-powerful tools and greater access to data, these businesses have enjoyed increased productivity and revenues, improved employee morale and dramatic growth.

Sequel Inc.

Responsive Recycling

Downsizing can be a shot in the arm for a company. At Sequel Inc., of Santa Clara, Calif., it has been an elixir of life.

Once an unprofitable division of Unisys imperiled by a divisionwide layoff, Sequel, which was formed by a management leveraged buyout in 1989, used downsizing as a strategy to prosper in a constantly shrinking market. Sequel is a remanufacturer of computer parts. That is, it contracts with computer manufacturers to rebuild and repair disk drives and other components from machines that the manufacturers no longer make but that are still in wide use. In order to do business, Sequel must be able to achieve cost economies that are better than the manufacturer could achieve itself and still turn a profit.

The company has become so successful at winning new business that in the last three years it has doubled its revenues. And in a dramatic lesson to other domestic manufacturers, Sequel's flexibility and tight cost controls have helped it lure manufacturing business back to U.S. shores from legendarily low-priced foreign contractors.

In the summer of 1990, in an effort to streamline and become profitable where Unisys had not been, Sequel relinquished its $1 million-a-year Unisys mainframe and brought up a Novell LAN and a manufacturing resource planning system from Expandable Software Inc. The old, mainframe-based MRP system was difficult and expensive to modify and hard to

PHOTO BY DAVID POWERS

PAUL CARD *(left) and*
SEAN MEIGHAN:
Thanks in part to Sequel's downsizing efforts, the company is luring business back from low-priced foreign contractors.

use. With the slow-moving, proprietary mainframe, the company also found it impossible to give users easy access to data from all areas of the company or to electronically monitor the production line. The new LAN-based system, on the other hand, which allows users to sort data and print reports without help from the IS department, was easily interfaced to inventory and the production line and was customizable to Sequel's business needs.

Sequel obtains the parts it uses from manufacturers' old inventories and from customer returns. The new MRP system helps Sequel to log and track every usable, saleable and repairable part in order to rebuild components at the least cost. It also tracks the number of products workers generate. This helps Sequel identify areas where it might need to improve productivity or add workers, making it possible to use contract labor to meet the company's wildly fluctuating production demands.

A statistical process-control system on the network monitors manufacturing errors, identifying trends

> I don't think we'd have those people as customers if it weren't for our ability to control and chart our manufacturing processes the way we do."
>
> *–Paul P. Card III*

WorldCorp

Flexible Fliers

The cost savings, flexibility and wide array of software associated with smaller platforms often make a downsizing project easy to justify on the IS payoff alone. But a downsizing project at WorldCorp, a $400 million air-transportation company based in Herndon, Va., has also resulted in faster financial closings, a shorter technical learning curve, better relationships between IS and users, and an increasingly independent and effective user community.

In early 1991, Director of Information Systems Clarence E. Johnson began evaluating the company's IBM 4381 mainframe-based financial systems in order to solve a couple of problems. Problem one was that the financial packages were so heavily used that the system went down frequently. Problem two was the system software's inflexibility: In order to run a payroll for any one of its five companies, WorldCorp's IS department had to shut down financial operations for the other four. Finally, the software was downright unfriendly. Users spent hours keying in parameters for reports that had to be run overnight when no one was using the mainframe. If a report came back the next morning needing correction or modification, it had to be done again.

Johnson had a choice: add mainframe capacity and upgrade the software to make it more friendly and reliable or invest in an easily expandable platform that offered a broader array of flexible, user-friendly software. He decided that it would be cheaper and more effective to chuck the mainframe than to try to upgrade it. So, in January 1992, the company downsized its financial systems to a Sun Unix network of workstations and PCs.

Since the downsizing, WorldCorp's annual maintenance fee for its accounting systems has dropped from $120,000 to $18,000, and its overall software costs have dropped by 24 percent. The company has also saved $1 million in mainframe hardware leasing costs.

With workstations on users' desks, the network is better able to handle processing demands. And downtime for all the company's financial systems has been reduced by 90 percent, according to Johnson. In addition, the new platform allows companies to run their payrolls and

CLARENCE JOHNSON *is eager to apply the system's flexibility to applications like crew scheduling, flight and cargo tracking and parts maintenance.*

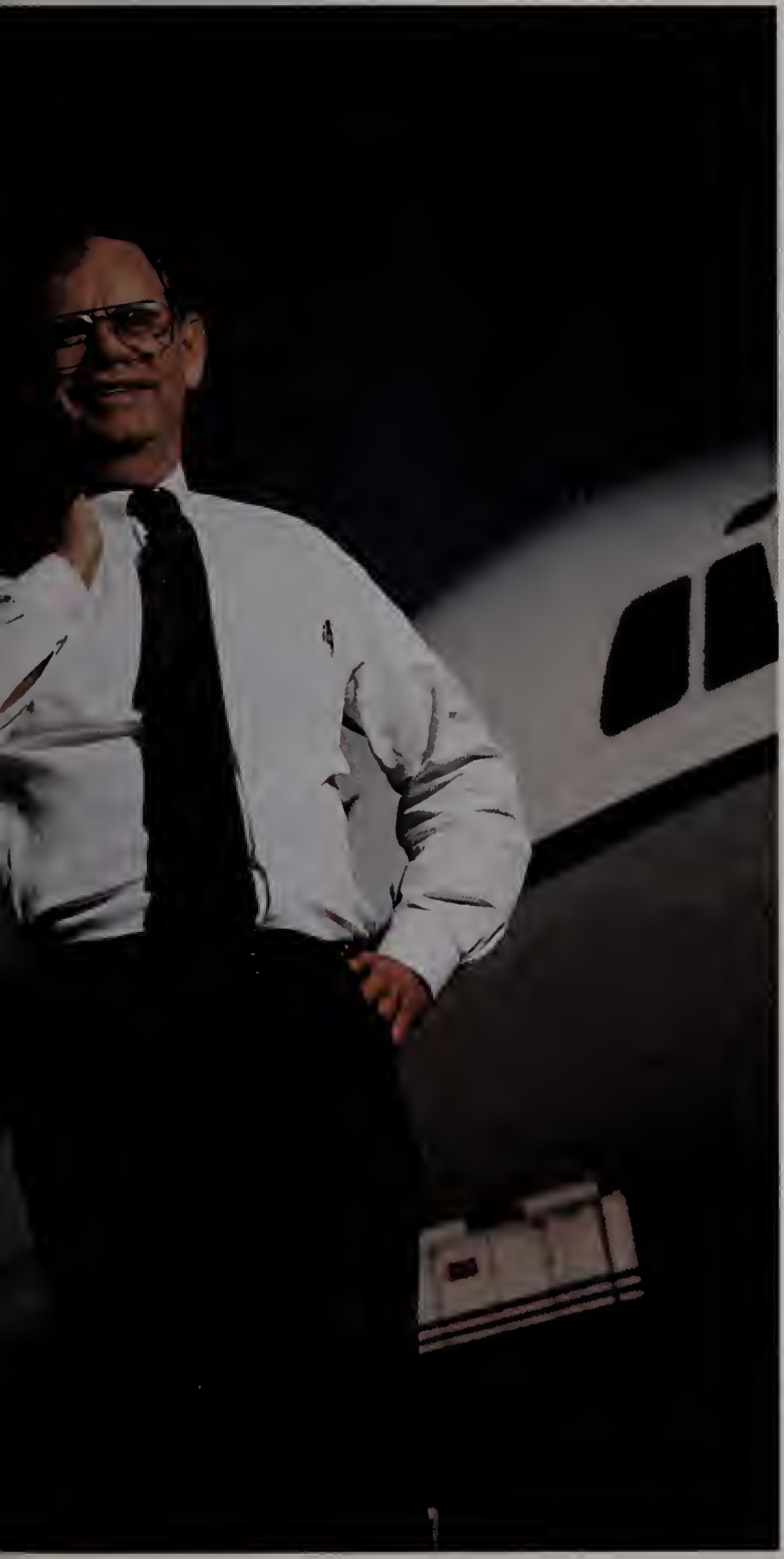
PHOTO BY KATHERINE LAMBERT

and even suggesting solutions to operators before the glitches become manufacturing problems and result in lost production time.

According to Sean C. Meighan, Sequel's manager of information systems, the new software is more easily maintained than the mainframe software and has vastly simplified the systems-development process. Once the new platform and software were in place, Sequel's monthly IS costs dropped from $100,000 for the mainframe to $8,000. Since then, the company's rapid growth has resulted in eight network expansions, and monthly IS costs now hover at around $40,000.

The recession has been good business for Sequel, which has increased its revenues from $60 million to $130 million since August 1990. The more flexible platform and improved MRP system have enabled Sequel to recycle parts so efficiently and cheaply that it has been able to win new business from major computer manufacturers. Despite their large size, these companies have found it cheaper to use Sequel than to remanufacture their own components.

"I don't think we'd have those people as customers if it weren't for our ability to control and chart [our manufacturing] processes the way we do," said Manager of Purchasing Paul P. Card III. "I think they'd be doing their own [remanufacturing] in-house." Today Unisys, which used to account for 95 percent of Sequel's revenues, makes up only 25 percent. Sequel has been so successful at keeping its costs down with the new systems that it recently made an offer good enough to persuade disk-drive manufacturer Maxtor Corp. to leave its Singapore contractor and do business in Santa Clara.



financial reports whenever they want, regardless of what the other divisions are doing. WorldCorp can now receive financial reports from each company several times a day and better monitor their progress.

Printing reports, issuing checks and making changes is so easy, according to Accounting Operations Manager Cheryl Coleman, that she can now spend time managing the company's cash flow. (In the overloaded mainframe environment, she had to cut all of her checks at the same time, so there was no juggling of payments to make ends meet.) Users are also happier, and productivity is up because they can work during the time they formerly spent waiting for other companies to run their payrolls.

An easy-to-operate user interface—from Progress Software Corp. of Bedford, Mass.—helped shorten the learning curve of moving to the new financial systems from days to hours, according to Tammy Linskens, IS customer support manager. "New people can learn this system in a day," said Coleman. "With the mainframe [software], it would be six months before you felt comfortable."

Although Johnson is excited about the project's initial payoff, he is eager to apply the system's flexibility to dynamic, information-intensive new applications that weren't possible with the mainframe—for example, crew scheduling, flight and cargo tracking and airplane-parts maintenance. In the meantime, he joked, the company got another small payoff when it trucked the mainframe out the door last October. "We got enough [for it] to pay the shipping and to run down to McDonald's for lunch."

Since the downsizing, WorldCorp's annual maintenance fee for its accounting systems has dropped from $120,000 to $18,000, and its overall software costs have dropped by 24 percent. The company has also saved $1 million in mainframe hardware leasing costs.

Comcar Industries Inc.

Short-Order Shipping

MICKEY FOUTZ: *The new platform allows for a tighter rein on dispatching and financials.*

PHOTO BY DOUGLAS JOHNS

Scratch a trucking company, and what you find behind the tractors and trailers and drivers and loads are dispatch logistics, shipping information and operational economies that separate the profitable outfits from the endangered ones. With freight rates seemingly frozen in time and cutthroat competition for loads, making a buck often comes down to saving a buck.

Comcar Industries Inc., a trucking company located in Auburndale, Fla., downsized its systems from a mainframe to a Hewlett-Packard Unix network of workstations and minicomputers in 1992 as part of a management decentralization effort. A steering committee spent the better part of a year looking at a variety of approaches. The business goal was to deliver better financial and operational information by putting the tools and the responsibility for managing that information out at the divisional level.

The new platform has allowed Comcar to loosen its management grip while keeping a tighter rein on dispatching and financial information, according to CFO Mickey Foutz. A new financial system went live at the first divisions a year ago, and while the company is still only looking at early returns, those returns are promising. At Coastal Transport Inc. in Savannah, Ga., the company's flatbed-trucking operation, the system has reduced the operating ratio—that is, expenses divided by revenue—by five points since October 1992.

The Unix network allows Coastal Transport dispatchers to better manage the company's fleet of 3,000 trucks, whose drivers may be calling in from the road via pay-phone or two-way radio at any time during their trips. Using the system, a dispatcher records the check-in on a minicomputer terminal and can determine which truck is in the best position to pick up a new order. This minimizes the number of empty miles each vehicle travels. "Before, we might have dispatched a truck 300 miles to pick up a load, but now the screens tell us where the closest one is," said Foutz.

Rates in the trucking industry have not changed significantly in a decade, according to Foutz, so efficiency gains are the only means of squeezing extra profit out of the business.

Financial information is more closely managed as well, according to William D. Shotts, operations manager for Coastal Transport. That has allowed his division to improve its cash-flow cycle time by three days. In addition, workers no longer have to keep up with tons of paperwork. The company has redeployed some of these workers and created a night shift that allows it to have a dispatcher on-call for customers 24 hours a day. Overall, said Shotts, the system has freed employees to devote more time to customer-service activities, dealing one-on-one with drivers and customers, and thereby developing more-personal relationships. Shotts reports a higher level of driver retention and attributes discernible customer-satisfaction gains to this change.

> **R**ates in the trucking industry have not changed significantly in a decade, so efficiency gains are the only means of squeezing extra profit out of the business.

The divisions are now able to deliver better, more-timely financial and statistical information to headquarters. The mainframe was so slow that the company would be three weeks into the new month before it knew how it had done the previous month. The Unix system so far has allowed the divisions to get that information out within a week of the month's end, and the company's goal is to be able to deliver it weekly, according to Corporate Controller Jeff Sawyers. Sawyers himself has reduced his corporate financial staff from 36 to 30 as a result of the integration between the divisional reporting systems and corporate accounting.

Employee satisfaction with the system has been a less-measurable but equally significant payoff, Foutz said. "Now employees talk to me when I visit."

STRATEGIC SYSTEMS REVISITED: *FirstLine Trust*

A Concerted Effort

A knowledge-based system, reengineered workflow and productivity tools produce impressive results

Downsizing projects can result in Cinderella-like transformations. For many organizations, however, the benefits come only after long-term changes and the scaling of a steep learning curve. Such has been the case at FirstLine Trust, a mortgage bank based in Toronto, which downsized its underwriting system from a Digital Equipment Corp. VAX to a Novell LAN in 1991 (see "The Power of Positive Shrinking," *CIO*, Oct. 1, 1992).

FirstLine had hopes of better marshalling its customer information, improving underwriter productivity and lowering costs. As of last summer, the company had realized only marginal productivity gains and was reluctant to pronounce the project a true success. By this spring, however, Vice President of Information Technology Janet Wilson was enthusiastic about the maturing system's snowballing payoff, which includes dramatic cost reductions, drastically improved productivity and billions in new business for the bank.

The system features productivity tools that will perform calculations, produce documentation and help users make faster, better-informed decisions. But after six months, the average user was still writing only 76 loans per month (the previous average was 66). FirstLine spent some time redesigning the workflow, and in the ensuing months, monthly underwriter productivity jumped to 105 loans apiece. As a result of this leap, FirstLine added $2 billion in new mortgages in 1992.

The knowledge bases that drive the system free skilled underwriters to handle exceptions. They have also allowed the company to hire less-skilled—and less-expensive—workers to handle its growth. Thus, while expanding the company's capacity for business, these changes have reduced FirstLine's monthly mortgage-processing costs from $12 per mortgage to $6. By 1995, Wilson said, the company expects that cost to drop to $3.

The system offers the promise of additional revenues by tracking customers' reasons for canceling policies. The company plans to use that information to remarket and recapture business where possible. The average success rate for such systems is a modest 10 percent, according to Wilson—at FirstLine, that's about $35 million annually.

Contrary to one of the paradigms of downsizing, maintenance and support for the new system have not proven less expensive than for the VAX, and Wilson does not expect them to be for a long time. The company is trying to implement so many new technologies and improvements, and micro technology changes so rapidly, that the cost of the system still tends to be high, she said. "But I'm not sure overall cost is even important to us. We're only concerned about cost per mortgage and productivity gains. [And] we couldn't be doing the volumes that we are without the system."

What's really important, Wilson indicated, is providing staff with easy access to valuable data. "Never in the past have we had information like this." *–M. O'Leary*

economic
in·form
response to interrogation by an
in for·ma pau·pe·ris \,in-,for-
[L, in the form of a pauper]
in·for·ma·tion \,in-fər-ˈmā-
reception of knowledge or int
from investigation, study, or
telephone number) purposely
munication system or a calc
forming against a person
by a prosecuting officer as
sented by a grand jury
uncertainty in the outcome
in·for·ma·tion·al \-shnəl,
information theory n : a
efficiency of processes
in telecommun
the communication
a : knowledge obtain
b : INTELLIGENCE, NEWS
bonds aim
Firms introduce instru
4393
76
567891
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14 KEY PIECES *of* INFORMATION

BY THOMAS KIELY

1

A Kroc of information

Business information comes in many forms and can work in mysterious ways. Take the famous case of Ray Kroc, the man who built the McDonald's restaurant empire. In 1954, Kroc, who was then selling machines for mixing milkshakes, traveled to San Bernardino, Calif., to get a firsthand look at a little hamburger joint that had ordered eight of his Multi-Mixers. What kind of restaurant, he wondered, would need to make 48 milkshakes at the same time?

He drove to the McDonald brothers' restaurant, parked and watched. He noticed that a line formed even before the place opened. All day, the customers tramped beneath the joint's gaudy golden arches to order burgers and shakes and fries. Kroc noticed how fast customers were served, the simplicity of the business, its cleanliness and efficiency. He watched from dawn to dusk for a couple of days, then impulsively approached the owners with a franchising proposal.

Kroc had been gathering business information, not business data. When he pitched his deal, he hadn't studied the owners' financial records, commissioned marketing reports or examined tally-sheets of lean beef bought and burgers sold. But he knew the McDonald's fast-food operation could be replicated anywhere in the world.

STORYLINE

In almost every organization, the information from which all business decisions spring resembles less an orderly strand of genetic material than a chaotic, unsolved jigsaw puzzle. The pieces are composed of different compounds, too: numbers, facts, hunches, goals, projections, dreams, reports, gossip, fanciful speculation.... To a technologist, perhaps, the percentage of business information that is safely, rationally computerized is frighteningly small. Instead, the stuff from which strategies are built floats more or less freely through the corporate air and waits for a leader to recognize in it a promising pattern and assemble it into a plan of action....

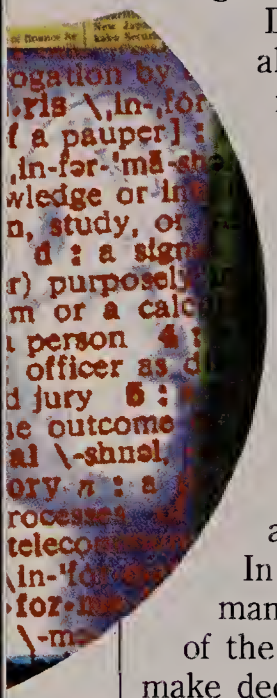
ILLUSTRATION BY MARTY GUNSAULLUS

2

Give us a heaping order of anecdotes and a side of reports

Information consists not only of solid, tangible facts on production runs, inventories and sales. Intuition, prejudice and hearsay figure into business decisions and are, in a real sense, business information, too.

"Some of the most valuable information I get from people is anecdotal," said James Mead, president and CEO of Capital Blue Cross, in Harrisburg, Pa. Anecdotes—about a hospital's billing practices, for instance—"give me a feeling for trends," he said. "Then I use reports to confirm this against reality."



Data by itself doesn't actually inform, according to a number of experts who are now taking an analytic look at the varied mosaic of inputs that constitute business information. Rather, information is news or facts imbued with meaning.

For top corporate executives, business information is generally collected and summarized by others. In fact, studies show that managers get the lion's share of the information they use to make decisions from people—through meetings, gossip, telephone conversations, impromptu discussions with subordinates or peers—and not from printed reports or data-rich information systems.

Very little of the information that flows through organizations is computerized—by some estimates as little as 10 percent. Computerized information is old news by the time managers see it because they have already heard it in summary form, according to Sharon McKinnon, associate professor and coordinator in accounting at Northeastern University in Boston and co-author of *The Information Mosaic*, a 1992 book about how managers obtain the information they use.

3

Snowshoes in Tampa, sunscreen in Nome

According to Peter Drucker, professor of social sciences and management at the Claremont (Calif.) Graduate School management center that bears his name, executives are data-literate but information-illiterate. Drucker believes that executives may be getting information they don't really need and not getting information they do need. In recent speeches and articles, he has chastised managers for not knowing what information they need to do their jobs, when they need it and in what form.

To illustrate the seductive dangers of information-illiteracy, Drucker cites the example of department stores, which lost chunks of their market share to specialty retailers and mail-order catalog companies. During the 1970s and '80s, the department stores collected an abundance of data about their customers. However, store managers failed to drill deeply into the data to unearth new demographic trends about who their customers were and, more importantly, weren't. Stores thus failed to capture much of the new market for young, affluent families in the 1980s.

4

I'm sorry, we can't answer that. And even if we could, no one would know where to find us anyway.

For information to be of value, it must be captured, prioritized, analyzed and understood. At any point in the continuum, its value can be subverted. And there are plenty of cautionary examples of what "organization" itself can do to subvert information.

Laurence Prusak, a principal with the Ernst & Young Center for Information Technology and Strategy in Boston, tells a story about a global company with 103 general ledgers. To get information about marketing costs, Prusak says, executives must ask 103 managers to extract the figures from their respective systems, then consolidate them.

At another corporation, top managers were interested in the company's consolidated training costs but dropped their inquiry when they realized that getting the answer would be both difficult and expensive. What they did not know was that a manager lower in the hierarchy had already done the job. Many companies' managers have no idea whom to call, within their own organizations, to get an answer to a question. So while it's a fine thing to possess organizational knowledge, it's a far better thing to possess an up-to-date knowledge inventory and a map of where each slice resides.

Even organizations renowned for quality can lag when it comes to managing information: In an Ernst & Young survey of winners of the Malcolm Baldrige National Quality Award, most of the companies confessed that they do not adequately manage their information about quality processes.

5

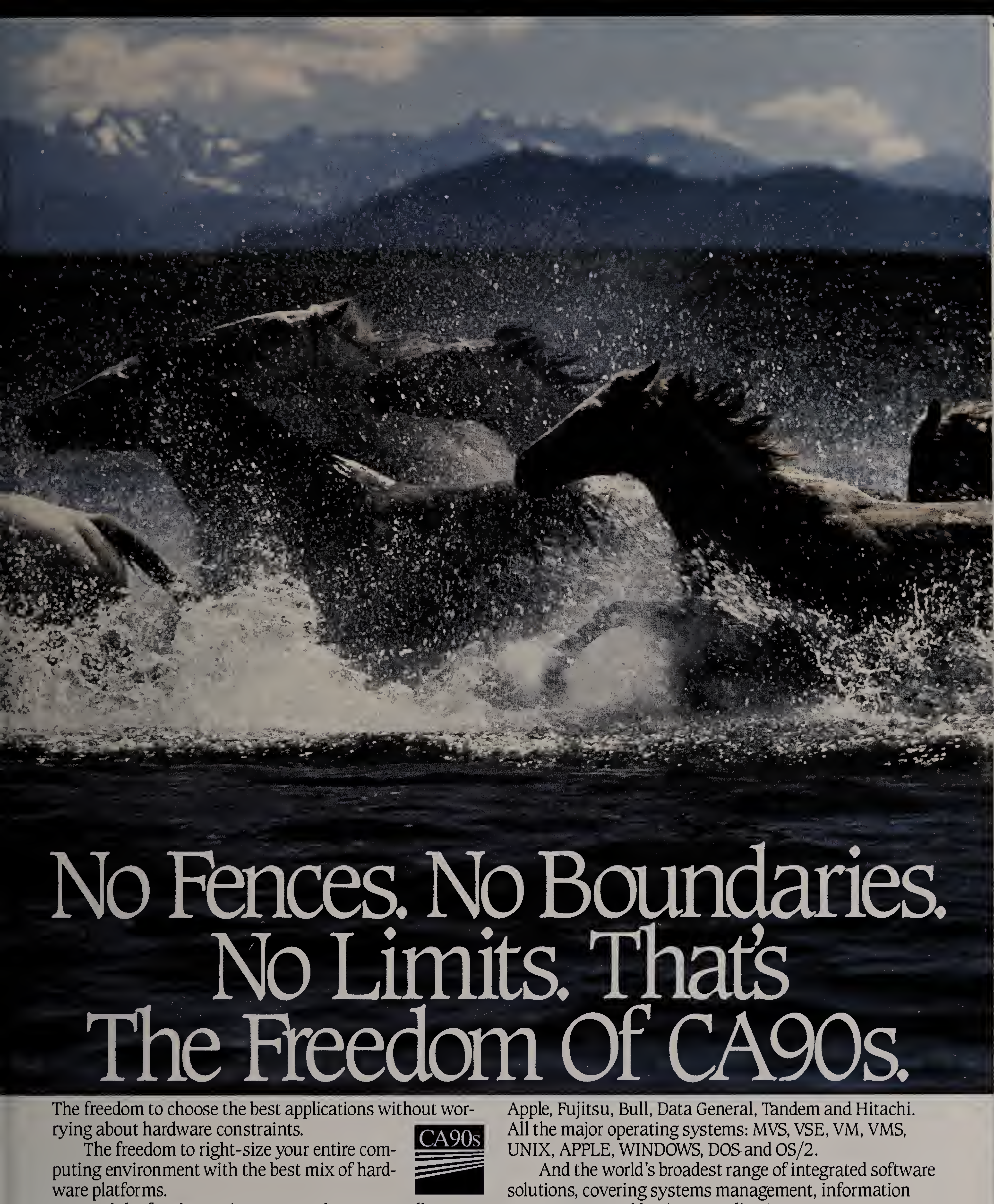
Caught in the number crunch

Larry DeJarnett, vice president and head of the information technology practice at A.T. Kearney, a Chicago-based management-consultant firm, points out that top managers of diversified conglomerates in the 1970s often managed their portfoilios of businesses strictly by the numbers. "Sometimes they looked at the numbers and missed the trouble they were facing. They saw only what they wanted to see in the data."

6

Please define the term "net premium" and use it in 17 sentences...

Organizations must grapple with inconsistent business information. For example, corporate units or departments may approach their business in diverse ways and, con-



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sequently, may define like data differently. "Organizations often don't have any idea of the magnitude of the differences they live with," said Stuart Madnick, John Norris Maguire professor of information technology as well as the leaders for manufacturing professor of management science at MIT in Cambridge, Mass. Madnick notes that at one U.S. insurance company (which he wouldn't name), net premium is the standard business measure—and yet the company has 17 different definitions for net premium, each equally valid.

7 The barons refuse to play ball!

To some degree, the definition of data is a political issue within companies. Politics colors the information top executives use and can determine what information they get to see. In organizations where executives' roles are defined by the information they control, there is little reason to share what they know, argues Thomas Davenport, a partner and director of research at the Ernst & Young Center for Information Technology and Strategy.

Davenport, along with fellow Ernst & Young consultant Prusak and Harvard University Professor of Business Administration Robert Eccles, studied the flow of business information at more than two dozen companies and published their findings in a 1992 article in the *Sloan Management Review*. "We found, first, that politics plays an important role in the management of information and, secondly, that companies were not addressing the political issues," said Davenport.

The authors found that in many large companies, strong managers at the helm of autonomous business units act as the information barons of their respective fiefdoms. They determine what information their units collect, how to interpret it and in what format it will be presented to the CEO. But this "ownership" of information undercuts the ability of the corporations' top officers to make informed decisions. In some instances, key business measures are not collected and analyzed. And feuds among barons sabotage information sharing.

8 But we're working on ways to make them play ball...

Some companies are grappling with information politics by creating collaborative rather than competitive organizational arrangements. In the case of London-based British Petroleum Co., three of the company's six managing directors head up primary business concerns (chemicals, refineries and exploration); the other three oversee geographical regions (Europe, the United States and Asia), with overlapping responsibility for all three business concerns within their regions. Simply to do their jobs, the directors are forced to share information with each other (and with the CEO).

Politics at the world's third-largest oil company has caused turbulence, however. Last summer, high-level BP executives and outside directors ousted Chairman and CEO Robert Horton (his dual title has been split between two successors). One reason for Horton's downfall was reportedly resistance within the company to his enthusiasm for teamwork, de-layering and empowerment. Nonetheless, BP's current managers continue to encourage the sharing of business information. Mike Collett, BP's head of information technology, reports that he is focusing his department's efforts on implementing technologies that foster "person-to-person communications, such as electronic mail and videoconferencing."

Echoing the warnings of Davenport and Prusak about misapplied technology, Collett notes that linking people directly to information sources such as databases, or linking information sources together, risks putting the cart before the horse. Employees first must learn how to share information before open access to information is thrust upon them.

"We're moving from feudalism to federalism," Collett said, "and that can't be done from the top down. It's driven from the bottom up, driven by the market. There is some tension over the sharing of information—the cultural issues are as big as the technical issues—but it seems to be working." Collett said that BP business units are now trading information about processes and practices.

9 Agreeing to agree about what's important

At Lord Corp., a privately held manufacturer of bonded rubber products, based in Erie, Pa., a multifunctional task force has been trying since last August to define the information relevant to the company's business. The task force, which is made up of high-level managers, has grappled with such questions as what is a customer, what constitutes a sale, what financial or human-resource measures should the company track, and what are the company's critical success factors?

William Ludwig, Lord's vice president of quality and information systems, says the company will try to make decisions about investments (in human resources or information systems, for example) based upon critical success factors, which will be communicated throughout the company in the hope of stemming political tussles.

R·O·I·T

EXECUTIVE RETREAT

MORE THAN MEETS THE EYESHADE

Executives at a *CIO* retreat debate the hows and whys of measuring the return on investment from technology

REFLECTIONS ON ROIT: *(from top to bottom)* **JIM GRANT** *(left), of C. J. James, and* **FRANK WAPOLE** *of ARDIS, listen intently during the general session; America West's* **TOM SMITH** *(right) and Ascom Timeplex's* **LYNN WILSON** *carry on a lively discussion over dinner;* **TOM CAIN** *(right) of Distribution Architects International, makes a point to Computer Associates'* **CHARLES WANG** *during a break; Alexander and Alexander Services'* **JOHN REECE** *(left) and Perrier's* **ROWAN SNYDER** *review the topics of the day.*

PHOTOS BY BOB WILCOX PHOTOGRAPHY

BACK AROUND THE TURN OF THE century, Western Union declined to purchase Alexander Graham Bell's patent for the telephone. The telegraph company's executives couldn't understand the attraction of the new invention. They had never considered holding conversations with people in other buildings before, and they couldn't imagine why anyone would want to do so.

Today's executives still find it difficult to evaluate the benefit of a new information technology investment, and the cost of failure can still be high. Many of the reasons for this difficulty, and some solutions, emerged at *CIO*'s first executive retreat on ROIT (return on investment from technology), held in Phoenix, Ariz., Jan. 24-26, 1993.

Sessions ranged from stand-up presentations by IS executives to an informal panel discussion

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among CEOs. Case studies were dissected in small break-out groups and then reexamined in a general session. And retreat participants left with the knowledge that there's more to ROIT than meets the eyeshade. ROIT includes

- not just finding better ways to calculate the potential ROI of an IT investment, but also ways to evaluate its risks.
- uncovering techniques to evaluate potential investments even when hard numbers aren't available.
- grasping that the most critical part of an ROIT analysis may be performing a reality check on your or your boss's intuition.
- understanding that the greatest ROIT is achieved when technology exploits radically changing business conditions; and
- realizing that the poorest ROIT can result from applying technology to the wrong business problem.

How do you evaluate the risks and benefits of a new, strategic system? Begin by considering the different kinds of risk involved in major IT investments, according to Eric Clemons, associate professor of decision sciences and management at the Wharton School of the University of Pennsylvania in Philadelphia.

Some risks revolve around money and technology: The project may be too costly, the technology won't work as expected, or the scope of the project exceeds the company's skills, expertise, and technical capabilities. Others are business risks: The completed system may be unsuccessful because it is not what the user wants, or because the business has changed in ways that render the system useless. Or the system may be so successful that it changes the business environment and renders cost and benefit assumptions obsolete.

Teamwork between IS and end users can also help systems developers identify ROIT.

Clemons provided several proven techniques for analyzing the risks and benefits of a potential IT investment. Companies can roll out the investment in stages, examining the costs and benefits at each stage before committing to full implementation, as health-care products company McKesson Corp. did when it set up its celebrated electronic order-entry system. When Barclays de Zoete Wedde launched an automatic order-entry system for its British retail brokerage business, it tested many different scenarios, including specific financial variables, using a wide range of assumptions to anticipate the costs and benefits.

Teamwork between IS and end users can also help systems developers identify ROIT. Ralph Szygenda, the CIO of Texas Instruments (one of the six companies profiled in *CIO*'s January 1993 ROIT issue) used this technique in building TI's worldwide electronic-purchasing system. Szygenda's IS organization worked with a team of procurement mangers to determine ROIT measurements. Together, they found that even a 1 percent reduction in TI's materials costs, which ate up 50 percent of its $6 billion annual revenues, would result in a $30 million savings.

What do you do when numbers aren't available? Try scenario analysis, Clemons suggested. Break down

COUNTERCLOCKWISE FROM ABOVE:

CIO *profilee* **CHARLES BROSHOUS,** *New York City Transit Authority.*

CEO panelists (l. to r.) **PHILIPPE KAHN,** *Borland International;* **PHIL WHITE,** *Informix Software;* **JOHN WHITE,** *Texas Instruments;* **FRANK WAPOLE,** *ARDIS;* **CHARLES WANG,** *Computer Associates;* **MICHAEL MCCOLLOUGH,** *Booz·Allen & Hamilton,* **BILL O'CONNOR,** *Ascom Timeplex.*

An afternoon workgroup examines its case study.

MIKE COUGHLIN, *Lever Brothers;* **JOHN WHITE,** *Texas Instruments.*

the problem sufficiently to select the path that offers the greatest possible return and the smallest possible downside, compared to doing nothing at all. Merrill Lynch executives broke a 14-month stalemate over whether to sell a financial-analysis system to their competitors by constructing scenarios and ranking the outcomes.

Companies can roll out the investment in stages, examining the costs and benefits at each stage before committing to full implementation.

Still, as the CEO panel made clear, the risks and returns of an IT investment are difficult to foresee. Michael McCullough, the senior chairman of Booz·Allen & Hamilton, said that upgrading an accounting system almost cost him his job, because the upgrade brought unexpected changes to the way his organization conducted its business. John W. White, the president of Texas Instruments' Information Technology Group, observed that while TI expected the main benefits of its network for worldwide manufacturing planning would come from reduced manufacturing costs, in fact, they came from increased sales. Evaluating technology investments is no different from any other business investment decision: "When you can, you manage by fact and analysis. But fundamentally, it's a subjective decision," said White.

"How then, do we build an intuition that is not just acceptable [to yourself and others], but correct?" asked Clemons. What are "the guidelines for increasing the odds" that your intuition is right?

The answer that emerged was to develop the ability to spot business opportunities and remain clear and focused on the fundamental business issues confronting the company. "It's easy to get discouraged by our inability to figure out the full value of an investment in advance," Clemons said. "But we can achieve real benefits if we pay attention to the opportunities in the firm."

BOB EVANS *(far left), of Corestates Financial, and* **DON LASHER** *(center), of USAA, participate in a workgroup on assessing ROIT.*

How do executives develop that ability? The answer is the same as the punch line to that old joke about how to get to Carnegie Hall—practice, practice. Retreat attendees had a chance to practice by examining case studies of two companies which made major investments in IT.

Hal Rosenbluth, the head of Rosenbluth Travel in Philadelphia, is one executive who saw a business opportunity and used technology to seize it. When he took over the family travel agency in 1980, Rosenbluth Travel had $40 million in bookings annually; by 1990 that figure had reached $1 billion.

Rosenbluth understood the frustrations of business travelers, who were overwhelmed by the explosion in air fares and routes that followed deregulation. Recognizing an opportunity, he concentrated on innovative ways to ensure that customers got the lowest fares. In 1983 he developed a way to list flights by fare instead of by time of departure, enabling agents to quickly find the cheapest rate. Once he confirmed that this would attract business accounts, he invested heavily in IT to automate the process. By 1985 the company's air bookings had reached $300 million.

Rosenbluth followed this success by stepping up his technology investments in order to provide even better service and lower fares. He created a database to track his customers' travel patterns and used it to negotiate better rates for business clients, to provide reservation clerks with data about client preferences and to ensure completeness and accuracy. Other large travel agencies have adopted some of Rosenbluth's innovations, but the high booking volumes Rosenbluth Travel achieved has enabled it to sustain its advantage over the competition.

Rosenbluth Travel did nothing that other agencies couldn't have done first, participants observed. But Hal Rosenbluth understood that a discontinuity such as deregulation provides opportunities; he was close enough to his customers to recognize their needs, and he grasped that IT was required to provide the flexibility and speed to exploit changing business conditions.

Why didn't big firms like American Express seize the opportunity first? Large companies take longer to make decisions, participants suggested. But the real reason was probably that successful companies find it difficult to break from the practices that made them successful in the past, even when the business environment has changed.

Companies may also lose sight of the critical business before them, as demonstrated by the case study of a major European bank which invested approximately $750 million in a new IT infrastructure. Participants observed that the bank violated many of the guidelines for minimizing risk and ensuring success.

JIM POAGE *(l.-r.) of Texas Instruments,* **BILL O'CONNOR,** *of Ascom Timeplex, and* **TOM CAIN,** *of Distribution Architects International, chat following a breakout session.*

The bank's executives hoped the new system would enable the company to overcome inefficiencies while providing employees with better customer information. This, in turn, would allow the bank to provide better service at lower cost than the competition. However, bank executives assumed the problem required just a technical fix and left it to the technologists to solve. They didn't understand that the bank's problem was really cultural and organizational in nature.

Rosenbluth understood that a discontinuity provides opportunities . . . and he grasped that IT was required to provide the flexibility and speed to exploit changing business conditions.

Without adequate guidance, the bank's IS executives chose goals for the system that were safe and conventional, but inappropriate: cost and headcount reduction. IS then gave the job of building the new infrastructure to outside consultants, who chose to create an entirely new infrastructure at considerable cost and high technical risk. The result was an expensive system that brought unexpected change to the bank's structure, yet went astray of the intended target. The bank's new system may have been intended to create competitive advantage, but it was not designed to achieve it.

As poorly thought through as this system was, it would be unfair to consider the bank worse than its competitors, or than most U.S. businesses, Clemons noted. Most businesses are still a long way from understanding how to evaluate IT investments and keep them aligned with business goals. If, as many said, evaluating IT investments is no different from evaluating other investments, the search for ROIT is no different from the search for the perfect mix of management skills. It is a question worth pursuing, even if there is no single answer. CIO

Crossing the Great Divide

CEOs and CIOs who want to know more about ROIT must first learn more about each other

Why do CEOs and CIOs fail to see eye to eye on ROIT? The answer, according to the computer-industry CEOs who spoke at *CIO*'s executive retreat on ROIT, is that the gap between IS and business executives remains large at many companies.

"There's a fundamental disconnect between CEOs and CIOs," said Charles Wang, the chairman and CEO of Computer Associates International. CIOs don't see themselves as CEOs-in-training and frequently do not know their industry well. Often, CIOs may be more loyal to their profession than to the company that employs them.

"CIOs have to help educate the CEOs, bring them in to understand what technology can do. And CEOs have to educate CIOs and bring them in as part of the business process," said Wang.

Philippe Kahn, the chairman and CEO of Borland International, said the problem is that CEOs and CIOs often don't work together as a team. Without the kind of trust one finds in teams, it's hard for CIOs to convince CEOs of the value of sharpening the company's IT tools with new investments.

Nevertheless, CEOs are becoming "more and more aware of the [competitive] threat of information systems and the opportunity of information systems," said Michael McCullough, the senior chairman of Booz·Allen & Hamilton. The importance of technology to the success of firms like Federal Express has become too obvious to ignore. By "making sure there is a vision and a strategy that's well understood," CEOs can help ensure that IS, and IS executives, remain focused on the business needs, and bring a solid return to their technology investments.

–A. Alter

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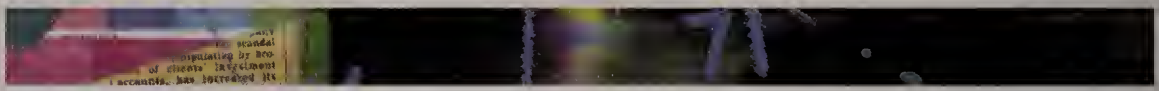

10

Don't blink or you'll miss something good

Business information is a moving target. "There is a constant evolution in the kind of information I look at," said Capital Blue Cross's Mead. While Mead (in common with CEOs everywhere) remains keen for data on sales, profits and productivity, changes in his business environment have forced him to pay more attention to health-care costs and the emerging twists and turns of managed care.

Mead's perceptions are echoed by fellow Bluesman Rogers K. Coleman, CEO of Blue Cross and Blue Shield of Texas, based in Richardson. "Most of our business information comes from the 36 million claims we process each year," said Coleman. "I take a good close look at costs. But we're also beginning to look at customer satisfaction. We've always had this information, but changes in technology afford us greater use of the information we have."

11

A system that reinvents itself each day in the image of the business

Imagine an information system that captures and stores a snapshot of the corporation's complex business day and evolves and learns as the organization does. That is the goal of a systems project underway at Kash n' Karry Food Stores Inc., a Tampa, Fla.-based retail grocery chain. The company intends to replace outdated mainframe-based business applications with a flexible, Unix-powered object-oriented system by 1996.

How will it work? Basically, explained Dennis Read, an information engineer at Kash n' Karry, the new object-based system will be structured around "business events or transactions as a businessperson would perceive them."

An example of such an event might be the decision of a buyer for Kash n' Karry to order a particular volume of a product at a specified price on a given date. Every such decision is linked to other decisions and, within a 115-store chain, requires complex communications: Buying the one product has consequences for the amount of shelf space available for competing products. And if, for example, a supplier's scheduled price increase doesn't materialize as anticipated, the buyer will need to revisit the original ordering decision to assess the effect of the change in projected price.

Kash n' Karry's new system allows the buyer to review a "snapshot" of the business as it existed on the day of the decision, as well as business perceptions that guided that decision. "If you're buying a house with the understanding that you're getting a certain mortgage interest rate, and then that rate changes, you'll need to review in your mind all the decisions you made based upon the original, incorrect information," Read said. "That's what our system does. The buyer can review his or her original perceptions and make retroactive corrections."

The system is structured to match the business, not the organization, Read said; if the business changes, the system can be tailored to fit new needs. Further down the road, Kash n' Karry would like to explore how to integrate neural-networking technology into the still-evolving system, "to let it learn and adapt on its own," he said. "We're moving toward a rule-based way of thinking."

12

Counting heads and everything that's inside them

Skandia Group, an insurance company based in Stockholm, Sweden, is in pursuit of new business measures that take into account the company's human and intellectual assets, not just its financial performance. "We're becoming what you call in the United States a 'virtual corporation,' " said Leif Edvinsson, Skandia's director of intellectual capital. "We're looking at customer capital, human capital [the knowledge employees possess] and structural capital, such as information-technology investments. These [measures] help us to refine our views about costs and investments in each of these areas. The CEO likes it—the [metrics] provide new insights. And they are used to organize the focus of other managers in the company."

13

Same as it ever was

Northeastern's McKinnon notes that the kinds of reports functional managers use haven't changed in 40 years. And Ernst & Young's Davenport observes that while a few executives may add grist about customer satisfaction, processes or quality to their already sizable piles of information, most do not.

14

Learning to live with the fuzzy truth

In the few companies probing the effectiveness of their business information, managers will have to learn to deal with inexactitude and ambiguity, according to A.T. Kearney's DeJarnett. Thus, if terminology differs among business units (what is net premium? what is a sale?), then let it differ; the variations probably reflect the heterogeneous terms of customers. The world isn't perfect, information isn't perfect, all systems leak, and organizational politics can send everything into a tizzy.

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TRAINING ON TAP

Just-in-time training transforms the work site into a classroom, giving employees as much coaching as they need, when they need it

BY RICHARD PASTORE

MOST I.S. PROFESSIONALS have heard of "just-in-time" inventory, JIT for short. For manufacturers, distributors and retailers, it means product arrives just in time to fill orders or meet demand. Now there's a new partner for the JIT prefix—training.

More broadly applicable than its inventory cousin, JIT training is computer-based training (CBT), coaching and performance support delivered where and when it's needed most—at the work site and on the job. Its advantages are broad as well. Workers spend less time away from their jobs and display greater retention. Course content is more modular, consistent and unbiased. Application rollouts go faster, and managers gain greater flexibility in workforce and job-task deployment. And while JIT training costs more to develop than traditional classroom courses, in the long term it can save money.

JIT training encompasses several types of instruction. At its simplest, it delivers to the desktop online reference material that workers can access as needed. More complex are the full modular courses available at the work site on networked personal computers or dedicated multimedia systems.

The most advanced form of JIT training is by and large still off in the future. "What we're headed for is training embedded in applications and customized for a particular worker or job type," said Joseph Wehr, president of training services at Data Base Management Inc., AMS course-

ROBERT DISTEFANO: *The large number of workers affected by Vanguard's rapid system rollout made it necessary to combine traditional and JIT training.*

PHOTO BY EUGENE MOPSIK

GORDON HILLEGAS: *"It's valuable for training on systems that rarely malfunction and provide few opportunities for on-the-job training."*

PHOTO BY CHUCK SAVAGE

ware developers in Manchester, Conn. Take the example of insurance-claims processors suddenly confronted with an unfamiliar data element. The online, integrated JIT support system would help them with that single requirement rather than subjecting them to a full-blown training course, Wehr explained.

Why should information systems people give a hoot about JIT? After all, IS has rarely ridden among the training vanguard (see "No Train, No Gain," *CIO*, Sept. 15, 1992). Unfortunately for IS ostriches, however, there is little chance of avoiding this movement, as most JIT training is delivered via networked PCs and multimedia systems that require IS support. Given the potential benefits, it makes political sense for IS to aggressively promote JIT.

"We encounter two kinds of IS departments," said Rex Allen, president of Allen Communication Inc., a CBT consultant in Salt Lake City. The first are obstructionists who want to maintain control and are fearful of individualized training. "The second are those who see this as an opportunity to spread their wings and be seen as a more important part of the business strategy. I've seen wonderful partnerships happen between IS and human resources when they come together to tell the big boss about these advantages."

JIT'S ADVANTAGE over traditional instructor-led training and CBT in the classroom come from moving instruction to the job site and delivering it in as-needed doses. The interactive nature of CBT and

The greatest advantages of JIT are its online "coaching" capability and the increased flexibility it affords managers in workforce and job-task deployment.

A JIT PROFILE

WHAT

Just-in-time training and performance support encompasses computer-based job instruction and online reference material delivered at the work site in as-needed doses.

WHY

Reluctance to absorb ongoing instructor fees and travel expenses

Need for more rapid application rollouts

Need for a flexible, redeployable staff

Few opportunities for live, on-the-job training

Reluctance to remove worker for classroom training

ADVANTAGES

Long-run cost savings of as much as 50 percent over traditional training

More than 50 percent greater retention

Trainees up to speed in half the time

Less time spent away from workplace

More flexible workforce deployment and job-task assignment

Self-paced, modular instruction

Consistent delivery of course content and corporate attitudes

DISADVANTAGES

High-level, long-term commitment required to reap payback

Higher initial development costs

Longer courseware development times

Few packaged courseware or development tools available

Most appropriate for deskbound workers

TECHNOLOGIES

Computer-based training courseware and/or expert-system software

Networked or standalone personal computers

Interactive videodisk and/or multimedia systems

Graphical user interfaces

the immediacy of work-site instruction can boost retention rates significantly. Training industry figures claim students leave traditional classrooms retaining barely 30 percent of what they learned. With JIT instruction, the retention rate can soar as high as 85 percent, according to organizations experienced with this method.

Job-site CBT also reduces workers' downtime. "With traditional training, we're taking the person out of the workplace," said Jack Compton, vice president of client services for Banc One Services Corp. in Columbus, Ohio. "Our strategy now is to deliver education to the people performing their jobs at the workstation." Banc One, which is growing rapidly via acquisitions, saw JIT as the answer to logistically difficult training demands. The bank worked with IBM's Audio-Visual Communication technology to design its first JIT system for a new branch office-automation system.

Perhaps the greatest advantages of JIT are its online "coaching" capability and the increased flexibility it affords managers in workforce and job-task deployment. For the U.S. Air Force's Air Combat Command (ACC), the combination of shrinking maintenance crews, high turnover rates and increasing aircraft reliability left fewer chances for instructor-led on-the-job training. The solution was an interactive videodisk "intelligent tutoring system" installed at the work site—alongside F15 and F16 jet landing strips. The 24-hour system emulates the best features of on-the-job training, including teaching expert diagnosis techniques and adapting coaching to individual student needs, according to Capt. Gordon Hillegas of the maintenance training branch of the ACC headquarters at Langley Air Force Base in Hampton, Va. "It's especially valuable for training on systems that rarely malfunction and, as a result, provide few opportunities for on-the-job training," he noted.

At Banc One branches, desk-bound customer-service representatives can consult an online reference coach for information on individual product lines. "The system has information on all our products, so if the reps don't know what some of the checking-account features are, they can look it up and give the information to the customer right there," said Jewell Beatty, a bank implementation manager in the Banc One client-services group. Although this coaching is available on an as-needed basis, it falls short of pure JIT because it runs

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VOLUME TWO
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TRENDLINES

DON'T FORGET THE NAILS

For the weekend renovator unaccustomed to drawing up workable plans and estimating and selecting building materials for do-it-yourself projects, the Weyerhaeuser Co. is now offering one of the more interesting computer-based kiosk applications.

Weyerhaeuser's DesignCenter, which debuted recently in building-supply and home-center stores, automates the project design and estimating process. While the marketing aim is to boost sales and employee productivity at the retail outlet, the added value to the do-it-yourselfer is in time, money and aggravation saved.

The system is fast (10 to 15 minutes to design a deck) and accurate (providing exact materials costs). Currently the kiosks are programmed only for decks, but garages, shelving units and other projects will be added to the system soon.

To operate the kiosk, a store employee uses a simple trackball device to prompt the customer through the design. Customers can opt for a deck that is either attached to the house or not, anywhere from ground level to six feet high, with one level or two.

Once the dimensions are set, the customer chooses the type of decking and the direction it will run in. A variety of railing styles are offered, with different balusters and headers, depending on the customer's tastes and budget. The system automatically sets the correct joist, beam and support-post placement.

Finally, when the design is complete, the system displays a detailed, 3-D image that can be manipulated on screen to show any angle, top to bottom, right to left. Another prompt shows the cost of materials for the current design. Too expensive? Try a simpler baluster style or trim down the square footage—then compare the two designs and costs side by side.

When the customer chooses a final plan, the DesignCenter prints out a 3-D color depiction of it, along with construction details, an itemized materials list (with current prices) and a "how-to" booklet on basic deck construction. (These are usually available only with the purchase of the project.)

The DesignCenter, which has been nominated for the *Computerworld*/Smithsonian awards for technology innovation, is the product of Innovis Interactive Technologies, a subsidiary of Weyerhaeuser. The kiosk was created, said Innovis President Mark Lembersky, as "a way to provide a value-added [service] to retailers that would help improve the store's image and sales and, at the same time, deal with the shortage of skilled workers on the store floor." Lembersky called the kiosk "remarkably easy to use," and reported that "almost all salespeople become proficient in 15 minutes."

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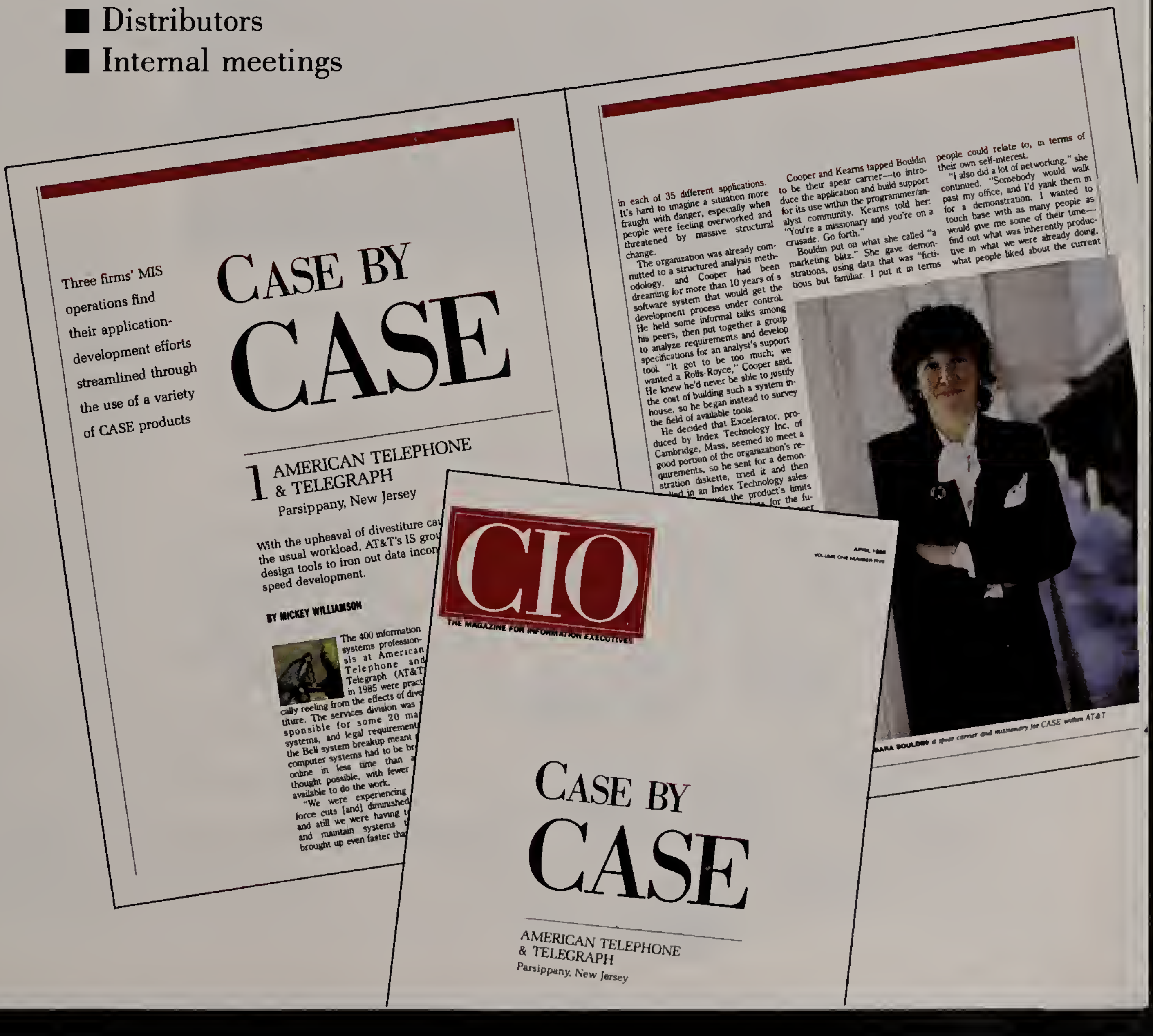

Three firms' MIS operations find their application-development efforts streamlined through the use of a variety of CASE products

CASE BY CASE

1 AMERICAN TELEPHONE & TELEGRAPH
Parsippany, New Jersey

With the upheaval of divestiture ca
the usual workload, AT&T's IS grou
design tools to iron out data incon
speed development.

BY MICKEY WILLIAMSON

The 400 information systems professionals at American Telephone and Telegraph (AT&T in 1985 were pract
cally reeling from the effects of dive
titure. The services division was
sponsible for some 20 ma
systems, and legal requirement
the Bell system breakup meant
computer systems had to be br
online in less time than
thought possible, with fewer
available to do the work.

"We were experiencing
force cuts [and] diminished
and still we were having t
and maintain systems t
brought up even faster tha

in each of 35 different applications. It's hard to imagine a situation more fraught with danger, especially when people were feeling overworked and threatened by massive structural change.

The organization was already committed to a structured analysis methodology, and Cooper had been dreaming for more than 10 years of a software system that would get the development process under control. He held some informal talks among his peers, then put together a group to analyze requirements and develop specifications for an analyst's support tool. "It got to be too much; we wanted a Rolls-Royce," Cooper said. He knew he'd never be able to justify the cost of building such a system in-house, so he began instead to survey the field of available tools.

He decided that Excelerator, produced by Index Technology Inc. of Cambridge, Mass, seemed to meet a good portion of the organization's requirements, so he sent for a demonstration diskette, tried it and then

Cooper and Kearns tapped Bouldin to be their spear carrier—to introduce the application and build support for its use within the programmer/analyst community. Kearns told her: "You're a missionary and you're on a crusade. Go forth."

Bouldin put on what she called "a marketing blitz." She gave demonstrations, using data that was "fictitious but familiar. I put it in terms people could relate to, in terms of their own self-interest.

"I also did a lot of networking," she continued. "Somebody would walk past my office, and I'd yank them in for a demonstration. I wanted to touch base with as many people as would give me some of their time—find out what was inherently productive in what we were already doing, what people liked about the current

BARA BOULDIN: a spear carrier and missionary for CASE within AT&T

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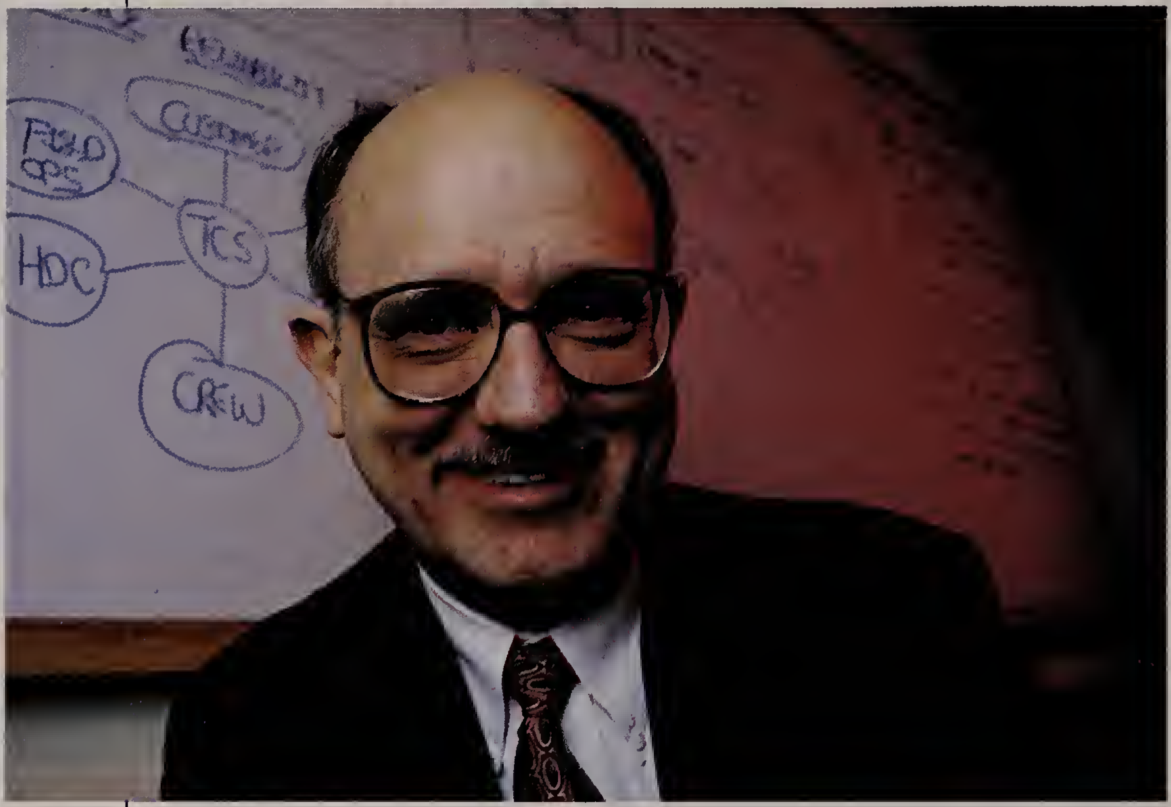
CASE BY CASE

AMERICAN TELEPHONE & TELEGRAPH
Parsippany, New Jersey

beside, rather than being embedded in, the main branch applications. But the bank is working toward this goal, according to Compton. "We're in the process of building a lot of reference text into the application so an individual doesn't have to leave the application if they have a question."

JIT'S READY AVAILABILITY also allows managers to rapidly redeploy workers during crunch times or redirect their efforts toward hot new products or services. Such flexibility is increasingly strategic in competitive industries, where time-to-market pressures don't allow for weeks of classroom retraining.



NICK ERICKSEN: *At Union Pacific, JIT cut by one-third the time needed to cover the same material in a traditional classroom course.*

PHOTO BY KENT SIEVERS/GAMMA LIAISON

> **As a rule, an eight-hour day of instructor-led training is equivalent to just five hours of modular CBT courseware.**

General Dynamics Land Systems Division, an armored-vehicle manufacturer in Sterling Heights, Mich., designed its Computer-Distributed Instruction system in part to ensure both worker and job-assignment flexibility. The department has had to redeploy workers frequently, and in the past, this required engineers to work one-on-one with assemblers to get them up to speed. "The system has enough detail so that theoretically every one of our assemblers could perform the task at any of our 250 work benches," said Manufacturing Specialist Matt Kroll.

Because Land Systems manufactures armored vehicles for several customers besides Uncle Sam, assemblers might be called on to build a single part in any of up to 15 different configurations. "Our operators are never sure which configuration they will be doing next," Kroll said. But the networked JIT system is programmed to know what's coming, and it walks the worker through the steps peculiar to that configuration.

Besides keeping its workforce flexible, Land Systems' JIT system also monitors parts assembly via bar-code scanning, alerting workers in real time to mistakes and omissions. Combined with the efficiencies gained by flexibility, this real-time coaching has paid off in an 88 percent efficiency improvement, a 39 percent decline in rework hours per unit and a 74 percent dip in defect rates. All this for a $600,000 investment in home-grown text and graphics software, old IBM AT-class personal computers, bar-code scanners and a NetWare 386-based local-area network.

THE FLEXIBILITY of JIT training is also valued in the service industry. Mutual-fund vendors bank on JIT training to help them cope with business-volume peaks that require rapid manpower redeployment. To reduce training delays, The Vanguard Group of Valley Forge, Pa., employs online hypertext to coach new or redeployed customer-service reps in mutual-fund descriptions, investment objectives and historical performance. "Reps who might not be as familiar with new funds and investment programs can drill down into the system for the level of detail they need," said Robert DiStefano, vice president of information technology at Vanguard.

Vanguard has also brought actual training and skill testing to the desktop. Following a crash classroom course on the basics of a new back-office processing system, workers were able to access additional CBT skill-building exercises and tests back at their desks. This combination of traditional and JIT training was necessary because of the large number of workers (nearly 1,000) affected by the rapid system rollout. But DiStefano says this training tandem will be an important ongoing strategy for the company.

Faster training turnaround is another of JIT's key advantages, and it's a main motivating factor for many firms. While it takes longer to develop CBT courseware than traditional instructor-led material, that delay is more than compensated for by rapid delivery. As a rule, an eight-hour day of instructor-led training is equivalent to just

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five hours of modular CBT courseware, according to course developers. The time savings come mainly from the fact that students may choose only those modules pertinent to their job function. At Union Pacific Railroad Co., JIT cut by one-third the time needed to cover the same material in a traditional classroom course, according to Nick Ericksen, manager of program development for the Omaha, Neb., railroad.

Banc One launched its latest JIT training initiative to help speed the rollout of a strategic banking system. The size of the target audience (20,000 workers across 11 states) and the ambitious deadline for the rollout (24 months) made JIT a necessity, Compton said. The firm designed its CBT courseware and JIT reference support system with Phoenix and Preference tools from Legent Corp. Post-pilot analysis showed retention up 40 to 50 percent over traditional training methods, with errors down 30 percent among the first 3,000 people trained.

SINCE JIT TRAINING is computer-based, it shares some of the basic benefits of classroom CBT. These include eliminating or reducing the need for costly live instructors and travel expenses. It also lets students set their own training schedules and learning pace.

More subtle benefits include greater consistency and control. By eliminating multiple instructors, organizations remove a variable element and gain better control over the message. "It provides a more consistent portrayal of attitudes and values as well as skills," said consultant Allen.

That consistency was particularly important for Union Pacific. The railroad was trying to make a cultural shift from a regulated, slow-moving company to one that could function in a competitive market. The company found that the 60 trainers it had hired to instruct train crews in a new freight-tracking system were not consistently conveying either the skills or the corporate attitude. By switching to 260 CBT terminals located in locomotive crew-changing stations across the country, Union Pacific eliminated the potential for inconsistency.

CBT, Allen noted, also helps guard against race, age or gender bias creeping into instruction, an increasingly sensitive issue these days.

Of course, JIT training has its disadvantages and limitations. For one thing, it requires a bigger commitment and more development funds than traditional instruction. "Training has typically been done on a wing-it basis," Allen said. JIT users "must be far better organized in how they think about training; they need a more long-range, comprehensive game plan."

By eliminating multiple instructors, organizations remove a variable element and gain better control over the message.

The reason is money. It costs a lot to develop custom CBT courseware. There is little product available off the shelf, and even commercial development tools are scarce. Therefore, it takes a strong, long-term commitment to see an organization through the high up-front costs to the time when JIT starts to pay back.

Fortunately, once the course is developed, the costs of delivery decline dramatically as time passes. Banc One's Compton predicts that, spread over five years, the total cost of JIT for his company will be 40 to 50 percent lower than that of traditional classroom instruction.

JACK COMPTON: *The size of Banc One's target audience (20,000 workers across 11 states) and the ambitious deadline for the rollout (24 months) made JIT a necessity.*

PHOTO BY KEN FRICK

Cheaper, faster development technologies, such as object-oriented programming, will help reduce up-front expenses and make JIT more accessible to the masses, Wehr expects. Maturing wireless LAN technology will also make JIT more practical for the non-deskbound worker. Then maybe we'll see further uses for the JIT prefix: perhaps JIT networking, JIT telecommuting, JIT workgroups, JIT downsizing.... CIO

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A Standard Response

The European quality standard ISO 9000 directly addresses the needs of IS

BY SANFORD E. DOVER

ILLUSTRATION BY WARREN GEBERT

The first global quality initiative, from Japan, left American manufacturing in its dust. But while the Japanese movement transformed the international economic climate, its effect on the day-to-day workings of IS departments was far less dramatic. Now another quality thrust—this one from Europe—is gathering steam internationally. And CIOs who ignore it may endanger their departments' standing within their companies—and their companies' competitive position both at home and abroad.

The new movement is embodied in ISO 9000, a quality standard published by the International Standards Organization in Geneva. Unlike the Japanese movement that crystallized for the rest of the world with the introduction of the Honda Accord in 1975, ISO 9000 does not focus exclusively on manufacturing processes. Rather, it covers 20 functions within a company that affect the delivery of a quality product or service. These functions include training, purchasing, inspection and testing, aftersales service—and information systems.

Many people are calling ISO 9000 the second global quality initiative. The standard originated in the European Community's plan to become a single market on Jan. 1, 1993. Member nations wanted assurances that products moving across their borders would meet certain quality standards, regardless of their country of origin. Although compliance with ISO 9000 is purely voluntary, European companies have acted quickly to gain the competitive advantage that goes along with certification. England is currently in the forefront, with 20,000 companies certified since the standard's publication in 1987.

At the same time that Europe was turning to ISO 9000, standards bodies in the United States and other countries were considering revising their own quality guidelines. Cognizant that such efforts would probably duplicate—without appreciably improving upon—the European-inspired standard, these bodies chose instead to adopt ISO 9000. To date, approximately 400 U.S. companies—including Eastman Kodak Co. and E.I du Pont de Nemours & Co.—have registered as ISO-compliant, and many are beginning to demand that their suppliers also become ISO-certified. As public awareness of the standard grows, the number of certified companies may swell to the hundreds of thousands.

The overall ISO 9000 guidelines set forth three objectives. The first is to achieve and sustain the quality of products or services so as to continually meet the customer's stated or implied needs. The second is to convince company management that the intended quality is being achieved and sustained. The third is to convince the customer.

Traditionally, IS organizations have labored only on the periphery of the quality movement, frustrated by the difficulties of translating the principles of manufacturing quality into IS quality. Yet, ironically, IS has greater need for the discipline imposed by a quality standard than almost any other department. This is because, while IS executives have done a good job of managing technology, generally they have done a poor job of managing their organiza-

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tions. IS staff members tend to focus on the creative aspect of their profession rather than on accountability. As a result, the rest of the company tends to think of IS as a loose cannon that cannot be relied upon to produce consistent excellence.

In 1991, the ISO published ISO 9000-3—guidelines for the application of ISO 9000 to the development, supply and maintenance of software. By adopting 9000-3, IS departments can achieve discipline and uniformity without sacrificing creativity.

Coming into compliance with ISO 9000-3 usually takes from eight to 14 months for an autocratic, single-platform IS organization with 150 to 250 staff members. In the process of seeking registration, an IS organization may find that it is already in compliance. Here's what to look for:

- Does the organization have concise documentation available for procedures that affect the quality of development and support activities?
- Are those procedures being followed consistently by competent people with appropriate training?
- Is there a document-control scheme to ensure that obsolete documents are purged and current documentation is available where and when it is needed?
- Are internal audits performed by qualified assessors, and do they result in effective corrective action by management?

If these conditions do not exist, the organization will need to go through several steps in order to come into compliance with ISO 9000-3. It must first determine best practices for all procedures—unit testing, for example—that affect product quality. Those practices must then be documented and communicated to staff, who are required to follow them at all times. Finally, the results of following these practices must be demonstrated to internal and external customers, as well as to auditors.

This process will not conflict with any ongoing total-quality management program, most of which involve reducing defect rates. ISO 9000-3 is supportive of that goal, but it emphasizes preventing problems rather than correcting them after they have occurred. In addition, ISO 9000-3 is designed to work with all of the major software-development methodologies in use. The standard's flexibility recognizes that no matter how an IS organization chooses to build and implement its systems, certain things must be done well.

> *ISO 9000's flexibility recognizes that no matter how an IS organization chooses to build and implement its systems, certain things must be done well.*

The importance of ISO 9000 to any company hoping to do business in Europe is obvious. But the standard's appeal also stems from the fact that it is less demanding than the Malcolm Baldrige National Quality Award. Because it encompasses only 40 to 50 percent of the Baldrige requirements, ISO 9000 is seen by many as a stepping-stone to the Baldrige.

ISO 9000 has another advantage over its more celebrated cousin. Many people have begun to decry the Baldrige Award as a lot of hoopla surrounding a one-time demonstration of achievement, rather than a permanent commitment to quality. ISO 9000, on the other hand, is entirely market-driven, a response to customers who want reassurance that a company has quality processes and can be relied upon to deliver a quality product.

Toward that end, organizations that wish to gain and retain certification must establish internal audit groups, specially trained to make sure the organization is in compliance. Internal audits take place at least once a year and are buttressed by external audits conducted by representatives of the certifying organization. These independent inspections, in effect, audit the auditors to make sure that standards are being met and corrective actions taken where necessary.

When estimating the cost of certification, organizations should budget approximately $35,000 for the initial external audit (the figure varies with the size of the department). Such external audits are required every three years, thus ensuring ongoing compliance with the standard. In other years, less-extensive external audits will be performed at an annual cost of about $8,000. In addition, organizations should take into account any fees paid to consultants who might be used to jump-start the certification process.

The CIO is in an ideal position to spearhead the pursuit of ISO 9000 within the enterprise. An IS department that takes the initiative and qualifies for certification on its own will stand out as an exemplar of consistent excellence that the company as a whole would be wise to follow. It is also a sign to senior management that IS can now be counted on to fulfill its organizational responsibilities. The department's morale will be boosted by the awareness of what it has achieved. And the CIO can boast of a world-class IS organization that has been calibrated against the international standard for quality.

A complete set of ISO 9000 standards for U.S. organizations can be obtained from the American Society for Quality Control at 800 248-1946. The book *ISO 9000: Preparing for Registration* is also available; it can provide valuable guidance for CIOs seeking to register their organizations.

Sanford E. Dover is president and founder of Dover & Associates, an Atlanta-based consultancy, and guest lecturer in the Master of Science in Computer Information Systems program at Georgia State University.

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FRONTLINE

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BY PORTIA ISAACSON

There's much to learn and even more to love about the new releases that run atop Windows. Personal computer software is the most valuable intellectual property being created today—and this country's best hope for future productivity.

A Programming Dream

THE WORLD ON WINDOWS

It's time for some straight talk about personal computer software. I've spent a couple of months immersed in the new releases that run atop Microsoft Windows. As I fought down the usual resistance to changing work paradigms in myself and my workgroup, and as we struggled to distinguish our lack of expertise from immaturities (bugs) in the packages, one word emerged to describe the new generation of PC software: *extraordinary!*

I admit it: I've loved PC software ever since I toggled a little program into the front panel switches of an MITS Altair kit computer in 1975. The program made a nearby radio play a simple tune when it was tuned to an Altair-generated harmonic frequency that would, in today's PCs, send the FCC into spasms. What I loved about that little program was the dream it inspired in me of what would one day be possible with inexpensive, powerful PCs that I could program. What freedom! No longer would I have to sneak time on my company's mainframe.

My dream of personal computer software is finally taking form in Windows-based applications that are nothing short of astonishing. They are enormously valuable, an art form in utility.

In no time, Bill Gates nudged my dream closer to reality by building a Basic interpreter for the Altair. At the same time, I realized that I wouldn't need to program at all to get the PC applications I wanted, because thousands of entrepreneurs would jump on the opportunity. In stores such as The Micro Store, in which I was a partner, PC software on cassette tapes hung in plastic bags with duplicated manuals. Who would have imagined that from these lowly beginnings, PC software would grow to rule the computing universe?

A Sure Thing

MICROSOFT WINDOWS OR...

Are you still wondering if Microsoft Windows is ready for prime time, worth the investment or capable of surviving without IBM's support? Worse yet, could the Federal Trade Commission be so misguided as to derail our country's hope for working tools with the power and chutzpah to take us into the next century at the head of the productivity pack? Will the multivendor announcement that Unix is going to be more open and standardized even be noticed?

Microsoft Windows is here to stay, and it has the vision and strategic direction to bet your company on. Unless yours is a graphics-design-intensive environment (for which I recommend Macintosh) or a scientific/engineering-intensive environment (for which I recommend Sun or Silicon Graphics), Microsoft Windows has earned your commitment. So upgrade your PCs, network even the smallest workgroup (I recommend Novell, even in a mixed or "bi-computer" environment of Windows PCs and Macintoshes) and resign yourself to discussing WIN.INIs during your coffee break. Did I hear you say you are staying with DOS till it dies? Did you say that about mainframes and Wang word processors, too?

My dream of PC software is finally taking form in Windows-based applications that are nothing short of astonishing. They are enormously valuable, an art form in utility. No wonder they are creating multibillion-dollar companies. History will show that PC software is the most valuable intellectual property being created today.

Building Computer Literacy

THE FIVE P'S

If you, as CIO, are leading your company's vision of computing and communication, and if your organization needs an IT framework for dramatically increased productivity, it's time to look again at PC software. Everyone in your company who communicates, thinks about budgets, converses with many people on the telephone, gives presentations, takes notes or designs anything should be using a personal computer—and using it intelligently.

If I were master for a day of your organization (or of our country's retraining program), I would encourage and possibly even require each individual to enter equally into the Portia's Partners in PC Productivity Process, or P5 (see below). While the organization should fund most of the equipment and instruction, I would ask that some, if not all of the time invested be the employees' own, because their improved job skills would be mar-

If you, as CIO, are leading your company's vision of computing and communication, and if your organization needs an IT framework for dramatically increased productivity, it's time to look again at PC software.

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ketable outside as well as inside their current organizations.

You say your organization has already mastered PCs? Bet me. I visit too many organizations. I see the dazed look in the eyes of the people with PCs on their desks who are (1) still hoping they will go away or (2) praying no one will find out how computer-phobic or -illiterate they are (and that includes more than a few CIOs of my aquaintance).

Stamp out computer phobia and computer illiteracy in your organization.

Stamp out computer phobia and computer illiteracy in your organization. The P5 steps that each person should apply are:

1. Be sure you have a PC powerful enough to make Windows applications hum (e.g. 33MHz 386 with at least 4MB of memory) and a color display large enough and flat enough to make viewing a pleasure (e.g. 14-inch diagonal).

2. Choose to master just one of the following: word processing; spreadsheet; presentations; drawing; publishing; database; E-mail, fax, calendaring, communication/contact management and notetaking; personal accounting; practical necessities, your dream application and creative fun.

Base your choice purely on interest and enthusiasm rather than on job requirements. To learn the application of your choice, use manuals, help files, computer-based tutorials, books, children, videos, help lines and even classes. But most of all, spend hours and hours using the application in real-world situations. Learn it so well that your fingers perform it unconsciously.

3. In the process of mastering your favorite application, become very comfortable with Microsoft Windows.

4. If your company is progressive enough with P5 to have established P5 Peer Progress testing, take the test for your chosen application and reap the rewards of recognition (and perhaps pay increases) associated with your new skills.

5. Go back to Step 2 and pick another application or level. Keeping your computer skills competitive requires a lifetime commitment to learning and improving while becoming more productive and creative in information work and play.

But I can't type, you say. Spend a weekend exercising your fingers with "Mavis Beacon Teaches Typing!" (a PC program that plays like a game but teaches typing par excellence). You will type, and you will have fun doing it.

But I don't want to type because it is a low-prestige, near-mindless activity. Look again, please. PCs are not like typewriters—tools for reproducing someone else's thoughts. Could you think equally well before you could speak or write? PC applications are more like languages—each type a different means for thinking, creating and working. Once learned, each language (PC application) enables us to think, create and work at a more powerful level.

A Strategic Choice

MAKING AN INFORMED DECISION

OK, I'm convinced. But which brands of Windows software should I use? Good question. When you choose a specific brand of application for yourself or your organization, you play "I bet my future." It takes one to three years of regular use to really master any PC software package. You can save yourself and your company innumerable headaches by applying the same strategic thinking to choosing a specific brand of PC software that you applied 10 years ago to choosing a specific brand of proprietary mainframe. Any choice will be extremely costly to change.

Apply the same strategic thinking to choosing a specific brand of PC software that you applied 10 years ago to choosing a specific brand of proprietary mainframe.

The most common reason for changing brands of PC software is that the software dead-ends. Software dead-ends when the publisher cannot afford to continue development (dBase, for example, had Borland not purchased it) or when its paradigm is so stuck in the past that new generations pass it by (for instance, WordStar against WordPerfect and Microsoft Word). No matter which brand one chooses, a brilliant startup company (even an individual, possibly a programmer who works for you) may create a PC program that is so much better or simpler that it will displace your original choice.

I make a PC software brand choice for myself and my workgroup the same way I make a marriage. What follow are the choices I have made in software and my recommendations to you.

Word processing: In Windows word processing there are two choices: Microsoft Word and WordPerfect. My personal choice today is Microsoft Word, primarily because of the five years I have spent moving with Word up its release ladder. If your organization uses WordPerfect, stay with it. There are days that I consider switching because (1) some of my workgroup prefers WordPerfect, (2) its telephone support is terrific, (3) every release gets more appealing, and (4) the company is located in ski country.

What about Lotus Ami Pro? Some people think Ami Pro is a much better choice than Microsoft Word, but I haven't tried it yet. Would I give up the compatibility between Mac Word and Windows Word in my bi-computer world? I doubt it.

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Spreadsheet: In spreadsheets there are three choices. Lotus 1-2-3 is the weighty legacy. Microsoft Excel is the powerful present. And Borland's Quattro Pro for Windows is the mighty contender that guarantees Excel's rapid evolution into the spreadsheet-usability hall of fame. Spreadsheets move easily between Windows Excel and Macintosh Excel, a necessity for the bi-computer world. I use Excel.

Presentations: Two factors should affect your choice of a presentation-graphics package. First, creating presentations entails more than putting a few bulleted words on a slide. To really enhance your presentation productivity and impact, you need a whole presentation-design capability, like the outlining feature that Aldus Persuasion pioneered. Don't use any presentation-graphics package without it. Second, if the package has fun drawing tools and an easy-to-use data-graphing capability, bulleted-word slides will soon become an embarrassing part of your presentation past. This is especially true if you ask your graphics department for a little guidance, and if you increase your business-visual-thinking vocabulary (see "The Vision Thing," *CIO*, April 1, 1993). My choice for presentations is Aldus Persuasion on either Windows or Macintosh. Harvard Graphics for Windows is adequate, and Microsoft's PowerPoint is the one to watch.

Move cautiously if your goal is to produce color slides in the Windows environment. Earlier this year I stuck out a toe, but after investing tens of thousands of dollars of my own time and at least as much from Aldus, Autographix Presentation Partners and several graphics-consulting companies, Autographix admitted to a bug in its driver that was keeping me from being able to produce about half my slides. Keep in mind that no matter which graphics program you choose, if you use the Autographix driver you could encounter the same problem.

Drawing: Drawing and presentation graphics are definitely not the same, although I dream of the day when presentation-graphics programs will have more drawing capability. My choice for drawing is Aldus FreeHand on Macintosh; it is one of the main reasons that my Mac sits in my work area beside my Dell Windows system. Longtime drawing possibilities for Windows include Micrographx Designer and CorelDraw. Micrographx Designer's user interface leaves me cold, and CorelDraw just leaves me too often (with application errors). My personal preference in Windows is to try Aldus FreeHand (one of this month's projects) and then wait a few months before trying other Windows drawing programs again.

Publishing: Aldus PageMaker on either Windows or Macintosh is all the publishing program most folks will ever need. It is the easiest way to combine text and graphics into a layout, whether for a single-page flier or a 300-page book. You can do some of that with a word-processing program, but count on a lot of weirdness even in the best of word processors. Changing to the page-layout paradigm is the key. If you want to do page layout, shifting paradigms (and programs) is easier than contorting a word processor.

Database: We waited a long time, but Paradox for Windows was worth it. It's an awesome upgrade for both DOS Paradox and dBase users. Paradox excels in the multiuser-workgroup setting, and its object-oriented application-creation environment will have people programming who didn't know they could. The videotaped training program from Borland is very useful—there is just no substitute for watching TV and seeing concept after concept introduced as naturally as breathing. As I watched, I kept uttering, "Of course, of course," intermixed with "wow." Finally, a database for the rest of us.

If yours is an intensive, internal E-mail environment, E-mail is likely the application to win the hearts, brains and fingers of senior executives to PCs.

E-mail, etc: If yours is an intensive, internal E-mail environment, E-mail is likely the application to win the hearts, brains and fingers of senior executives to personal computers. I will not recommend one program because, since I hate E-mail, I dislike all E-mail programs equally. E-mail lacks the structure to access information by subject (e.g. project or conference), event (date, meeting, phone call, order, fax) or contact (client, supplier, press, bank), any one of which would be a better framework for internal or external communication. And just try E-mailing anyone outside your company with today's lack of E-mail-systems standards.

For calendaring (or you might think of them as resource-scheduling) programs for workgroups, I recommend OnTime, which reconciles nicely with the single-user version that can run on each worker's notebook computer. The paper printouts of OnTime are works of art, and using the visual interface is like playing an enticing video game.

WinFax Pro has my fax business (and most everyone else's), although there are some interesting comers.

Most people who use calendaring programs heavily and also keep databases of people with whom they communicate eventually figure out that Contact Software's ACT! is the program of choice. Now there is a Windows version, and it is compatible with Paradox for Windows dBase files, creating unlimited possibilities for contact-database manipulation within Windows. The only shortcoming is that ACT! for Windows does not yet operate in a multiuser networked environment; but there is hope.

If you really want to play with the future, try Slate's Looseleaf NoteTaker, Day-Timer Pen Scheduler and WinFax Pen on the GRiD Convertible pen computer. These applications are note-taking, calendaring and faxing using a pen-and-paper paradigm (little, if any, keyboarding is needed).

Personal accounting: Quicken by Intuit is a bookkeeping, financial-planning, budgeting and check-writing dream. Until Quicken, I had never thought managing money was fun. Had I possessed Quicken a few years ago, I might still be a millionaire.

Practical necessities, your dream application and creative fun: In the practical-necessities department, Traveling Software's LapLink Pro for Windows is as reliable as the DOS version, but with nice features for Windows and network users. You just can't move files between your desktop and your notebook without it—and it comes with cables.

I'll leave your dream application and your fun up to you. My fun is Autodesk's Chaos. For my dream application, see my aforementioned column on the visualizer.

A Productive Future

SOFTWARE RULES

Every time we look around, we see a whole new world of computing. Mainframes and minis gave way to desktops, and now desktops are giving way to nomadics. IBM and Digital toppled from their decades of computer-market rule to give way to Apple, Compaq, Dell and uncountable other companies building industry-standard computers.

Which companies will rule the new computer industry? Certainly not IBM or Digital. Not even Apple, Compaq or Dell. Will the new ruler be a telecom company like AT&T? How about a consumer-electronics company like Sony or Sharp?

None of the above. Personal computer software rules, and it is our country's hope for productivity. Cheer it on!

Imagine CIOs of the world's largest companies and CEOs of leading personal computer software companies sitting around an enormous table. They realize that their futures are inextricably intertwined. What do they need from each other?

Besides the continued evolution of software products, CIOs need testing and training programs with cross-company standards for competency levels in various applications. These standards may actually become as important as our standard educational-achievement programs (e.g. high school, bachelor's degree) and may have as much significance in the workplace.

What else? Now that software rules, better make a list. CIO

Portia Isaacson is president of Dream IT Inc., headquartered in Colorado Springs, Colo., a consultancy and publisher dedicated to providing quality business information to customers and creators of frontline IT.

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Calling All Road Warriors

Trucking company C.R. England & Sons is using advanced telecommunications technology to put the pedal to the metal, improving customer service and sales and cutting in half the number of support staff it needs per truck

In the old days, a trucker was a lone wolf barreling down the interstate whose only link to the outside world was a CB and a cup of hot coffee to ward off white-line fever. Welcome to the '90s, where competition is fierce and latter-day road warriors are armed down to their mudguards with the latest information technology.

Each week, trucking company C.R. England & Sons Inc. ships 1,500 loads of everything from semiconductors to ice cream coast to coast, with an on-time record of 98 percent, thanks to satellite-based tracking equipment on board its trucks and a companywide information network at its Salt Lake City headquarters.

In the mid-1980s, England had a communications logjam in two directions. Thirty percent of incoming customer calls were abandoned because lines were busy. Also, drivers were tough to track, and payroll clerks and fleet managers had trouble keeping up with them; the company needed one person at headquarters for every two trucks on the road.

England shifted into overdrive when it installed a ROLM 9751 Model 40 computerized private branch exchange with automatic call distribution, automatic number identification (ANI) via the ROLM ISDN card and ROLM PhoneMail. Calls are routed to specific phones, so customers deal with the same booking agent every time and get more personal, efficient service. An IBM AS/400 tracks ANI data, and if a customer's call doesn't get picked up, the computer alerts that customer's agent. In the meantime, since the computer knows who's calling, it can churn the paperwork, and the order can be partially filled out and sent to the booking agent's screen as he or she returns the call.

"Customers say, 'You guys are amazing; I just called you,' " Steve Glines, vice president of technology, noted with satisfaction. "They tell us our system's quicker and easier to get into and out of than the competition's." England's abandoned-call rate has dropped to less than 1 percent, and the company figures that turning these calls around adds $24,000 per week in revenues.

On the outbound side, trucks are equipped with a satellite antenna mounted on the cab and a data terminal inside so dispatchers can keep in touch with drivers. Previously, truckers had to check in with the home office whenever they'd stop for gas or a piece of pie. With the new equipment on board, they receive each order—including when and where to pick it up and drop it off—while they're rolling.

The truckers also have voice mailboxes at headquarters with 800-number access. When they do phone in, they can hook up directly with the computer, tapping into the latest information. This year, the company is trying out a new system by which the computer notifies drivers when they have a voice-mail message (a little light flashes on the in-truck terminal) and whether it's urgent.

"There's no comparison in the efficiency we have now," Glines said. "The system's cut our staff ratio in half, to one headquarters employee for every four trucks. Meanwhile, we've quadrupled our fleet from 300 trucks seven years ago to nearly 1,300 today, and revenues have increased from $40 million to $140 million." According to Glines, England's IS savvy makes the company King of the Road. *–Melanie Menagh*

VITAL STATISTICS

Organization: *C.R. England & Sons Inc., Salt Lake City*

Application: *Satellite-based fleet tracking; customer-order system*

Sponsor: *Dean England, chief operating officer*

Technologies: *ROLM ISDN Primary Rate Digital Network card in ROLM 9751 CBX; ROLM PhoneMail; IBM AS/400 computer*

Scope: *England headquarters staff and drivers; customers shipping freight*

Objective: *To provide more personal, efficient service to customers and communicate more quickly and cogently with drivers on the road*

Payoff: *Abandoned-call rate reduced from 30 percent to less than 1 percent; ratio of support staff needed for truckers cut in half; improved on-time delivery record; increased number of orders received*

Melanie Menagh is a freelance writer based in Brooklyn, N.Y.

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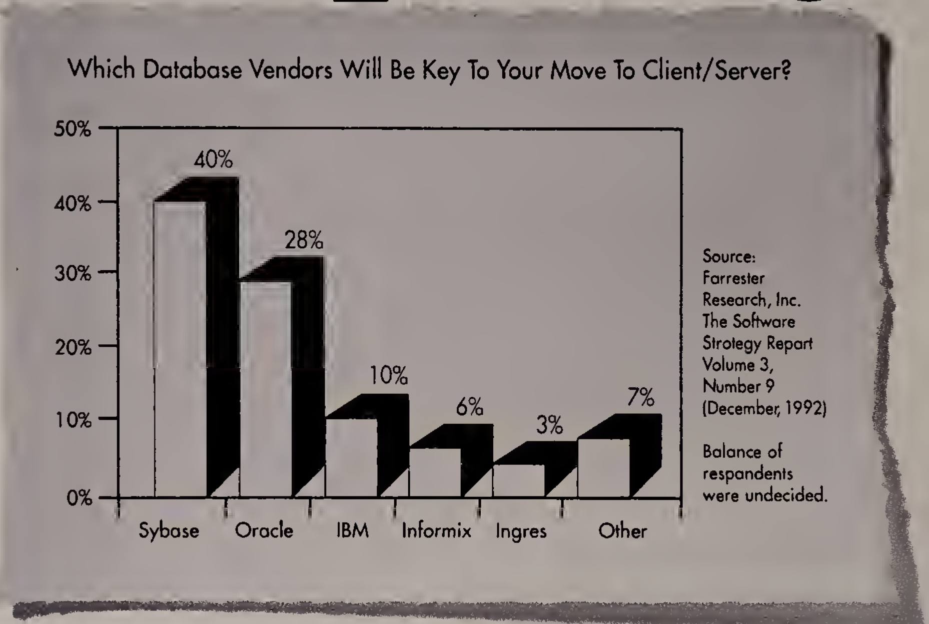

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